TEMPLATE FOR REVISION

COMMUNICATION STRATEGY

Action: Issuance of Marine Protection, Research and Sanctuaries Act Section 102 permits for StarKist Samoa and VCS Samoa Packing in American Samoa.

Projected Announcement: ~~Wednesday September 1, 1993~~ January [ ] 1998.

Location: American Samoa

Background: EPA Region IX has revised draft Marine Protection, Research and Sanctuaries Act (MPRSA) Section 102 permits for StarKist Samoa and VCS Samoa Packing. We are prepared to issue the special permits for a three-year period to allow the canneries to continue disposing of fish processing wastes off American Samoa at an ocean disposal site designated by EPA Region IX in February 1990. The special permits will be effective from ~~September 1, 1993~~ through ~~August 31, 1996.~~ Special conditions in the permits include: 1) waste stream limits, 2) monthly waste stream analyses and reports, 3) confirmatory bioassays ~~and plume model analyses~~, 4) use of a computerized navigation system aboard a new disposal vessel, 5) disposal site monitoring and 6) monthly and quarterly reporting forms. The canneries have been disposing of fish processing wastes off American Samoa since 1979 without any significant adverse environmental effects.

Press Release Information

1. Public Notices for draft permits were published in the *American Samoa News* on ~~June 8, 1993~~ and in the *San Francisco Chronicle* on ~~June 11, 1993~~.

2. Comments were received from VCS Samoa Packing (~~June 22, 1993~~) and StarKist Seafoods (~~June 30 and July 28, 1993~~).

3. Due to late comments from StarKist Seafoods and EPA Region IX's analysis of StarKist's new information, we administratively extended both ocean dumping permits (OD 90-01 and OD 90-02) until ~~September 1, 1993~~.

~~3.~~ Delete Waste stream limits and ocean disposal site loadings were reduced for most parameters because the wastes have been characterized better by the canneries.

4. ? Confirmatory bioassays ~~and new plume modeling work~~ are still required because the waste streams are different than previous reports, different volumes of fish processing waste are being generated at the StarKist Samoa plant, and a new disposal vessel, named the FV TASMAN SEA, will be used to dispose of the wastes at the designated ocean disposal site.

5. A computerized navigation system is required to provide more accurate prints of the disposal vessel tracks and better reporting forms have been prepared to provide data to EPA Region IX every three months instead of every six months.

Public Interest: Low

Staff Contact: ~~Brian Ross (W-7-3) 4-1979~~, or Patricia Young ~~(W-4) 4-1594~~ Allan Ota (WTR-2)
Division Dir.: ~~Harry Seraydarian~~ (W-1) Alexis Strauss (CMD-5) 4-1599
Attorney: None
Press Officer: ~~Lois Grunwald~~ (E-2), 4-1588 New name?

EPA REGION IX COMMUNICATION STRATEGY

Action: Issuance of Final Marine Protection, Research and Sanctuaries Act Section 102 permits for StarKist Samoa and VCS Samoa Packing in American Samoa.

Projected Announcement: ~~Wednesday September 1, 1993~~ January [illegible] ? 1998

Materials to be Prepared
A: Press Release
B: Final MPRSA Section 102 Permits
C: Response to Comments

By Whom:
Lois Grunwald ?
~~Patrick Cotter/Patricia Young~~ Allan Ota / ?
~~Patrick Cotter/Patricia Young~~ Allan Ota / ?

Note: Press Release at day 0 (September 1) when Harry Seraydarian signs the final permits.

AUDIENCE	DAY	EPA STAFF	METHOD	MATERIALS
Responsible Parties		? / Ota		
StarKist Foods	0	~~Young/Ross~~	Phone/Mail	B,C
Van Camp Seafood	"	"	"	"
		? / Ota		
StarKist Samoa	"	~~Young/Ross~~	Ph./Ex.Mail	"
VCS Samoa Packing	"	"	"	"
Media				
American Samoa	0	Grunwald	PR News	A
Hawaii	"	"	"	"
Federal Elected Officials				
NA				
American Samoa Elected Officials				
NA				
Federal Agencies		? / Ota		
USCG Liaison Office, AS	0	~~Young/Ross~~	Express Mail	B,C
USCG District, HI	"	"	Mail	"
DOI Territorial & Int. Affairs	"	"	"	"
NOAA Sanctuaries & Reserves	"	"	"	"
COE Honolulu District	"	"	"	"
USFWS HI	"	"	"	"
NOAA NMFS HI	"	"	"	"
FDA SSB	"	"	"	"
American Samoa Agencies		? / Ota		
Togipa Tasuga ASEPA	0	~~Young/Ross~~	Express Mail	B,C
Lelei Peau, ASCMP	"	"	"	"
Ray Tulafona, ASMWR	"	"	"	"
Alfonso Galea'i, ASEDP	"	"	"	"
Malaestasi Togufau, ASAG	"	"	"	"
Local Elected Officials				
None				
Public Affairs				
None				

AUDIENCE	DAY	EPA STAFF	METHOD	MATERIALS
Public Interest Groups See mailing list	0	?/Ota ~~Young/Ross~~	Mail	B,C
EPA Offices Oceans and Coastal Protection Division Regional Ocean Dumping Coordinators, Regions I, II, III, IV, VI and X PICO, Hawaii	0 " "	Ota ~~Ross~~ " "	Mail " "	B,C " "
Other Persons to be Notified None				

⊗ TEMPLATE FOR REVISIONS FOR BOTH CANNERIES

8/15/97

WTR-5

Allan Ota, Mike Lee

Here's my first draft of the revised ocean disposal permit. I changed a number of items. We should discuss if this is the way you want to go:

1. Eliminated analyses of individual waste streams and only requiring monthly analyses of waste store in on-shore storage tank. I put in section if fish processing procedures change then we can require them to do individual analyses. Otherwise, do you think we need to have them do individual waste stream analyses at all? (Or maybe once or twice a year?) I don't really think necessary.

2. Eliminated volume limits for individual waste streams; only have 200,000 gallon limit for disposal per day.

keep

3. Are bioassays required by regulation and calculations done to insure that LPC not being exceeded? Or is it sufficient that water quality standards not being exceeded?

4. Allan, you might want to redo the tables in Lotus format, I revised Pat's which were in Word Perfect and they don't really line up correctly. We might want to send the canneries a copy of forms (or email them) when the final permits are issued.

5. I added section if seas are rough can do alternate disposal pattern but must record conditions.

Allan, how are you doing on calculations? The present extension expires August 31. I will do re-extension. Think December 31 is enough time?

P.S. Did you know come October I'll be taking over the CNMI and Palau? We're hiring someone to replace me, while I take over Jim Branch's islands (he's retiring).

Pat

(1594)

DRAFT 8/15/97

MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT § 102
OCEAN DUMPING PERMIT

PERMIT NUMBER AND TYPE: OD97 ~~93~~-01 Special

EFFECTIVE DATE: ~~September 1, 1993~~ December 31, 1997

EXPIRATION DATE: ~~August 31, 1996~~ January 1, 2001

PERMITTEE:
StarKist Samoa, Inc.
P.O. Box 368
Pago Pago, American Samoa 96799

WASTE GENERATOR:
StarKist Samoa, Inc.
P.O. Box 368
Pago Pago, American Samoa 96799

WASTE GENERATED AT:
StarKist Samoa, Inc.
P.O. Box 368
Pago Pago, American Samoa 96799

PORT OF DEPARTURE: Pago Pago Harbor, American Samoa

WASTE TRANSPORTER:
FV TASMAN SEA
Blue North Fisheries, Inc.
1130 N.W. 45th Street
Seattle, Washington 98107-4626

A special ocean dumping permit is being issued to StarKist Samoa, Inc. because the Regional Administrator of EPA Region IX has determined that disposal of fish processing wastes off American Samoa meets EPA's ocean dumping criteria at 40 C.F.R. Parts 227 and 228. For this permit, the term "fish processing wastes" shall refer to Dissolved Air Flotation (DAF) Sludge, Cooker Juice and Press Liquor generated at the permittee's plant in Pago Pago, American Samoa; or any combination of the three waste streams pumped from StarKist Samoa's onshore holding tanks into the ocean disposal vessel for transportation to the ocean disposal site.

This special permit authorizes the transportation and dumping into ocean waters of fish processing wastes as described in the special conditions section pursuant to the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 (33 U.S.C. § 1401 *et seq.*) as amended (hereinafter referred to as "the Act"); regulations issued thereunder; and the terms and conditions stated below.

This MPRSA Special Permit does not contain any information collection requirements subject to Office of Management and Budget review under the Paper Work Reduction Act of 1980 (44 U.S.C. § 3501 *et seq.*). This determination has been made because the permit does not require data collection by more than 10 persons.

1. GENERAL CONDITIONS

1.1. Operation under this special ocean dumping permit shall conform to all applicable federal statutes and regulations including, but not limited to, the Act, the Marine Plastic Pollution Research and Control Act of 1987 (P.L. 100-220), the Clean Water Act (33 U.S.C. § 1251 *et seq.*), and the Ports and Waterways Safety Act (33 U.S.C. § 1221 *et seq.*).

1.2. All transportation and dumping authorized herein shall be undertaken in a manner consistent with the terms and conditions of this permit. StarKist Samoa, Inc. (hereafter referred to as "the permittee") shall be liable for compliance with all such terms and conditions. The permittee shall be held liable under § 105 of the Act (33 U.S.C. § 1415) if any permit violations occur. During disposal operations when the permittee's fish processing wastes are loaded aboard the disposal vessel in holding tanks, either separately or combined with similar fish processing wastes from other permittees authorized to use the ocean disposal site defined in Special Condition 2.2, the permittees shall be held individually liable under § 105 of the Act (33 U.S.C. § 1415) if a permit violation occurs. If a permit violation occurs during the transportation and disposal of fish processing wastes, the waste transporter may also be liable for permit violations.

1.3. Under § 105 of the Act, any person who violates any provision of the Act, 40 C.F.R. Parts 220 through 228 promulgated thereunder, or any term or condition of this permit shall be liable for a civil penalty of not more than $50,000 per day for each violation. Additionally, any knowing violation of the Act, 40 C.F.R. Parts 220 through 228, or the permit may result in a criminal action being brought with penalties of not more than $50,000 or one year in prison, or both. Violations of the Act or the terms and conditions of this permit include but are not limited to:

1.3.1. Transportation to, and dumping at any location other than that defined in Special Condition 2.2 of this permit;

1.3.2. Transportation and dumping of any material not identified in this permit, more frequently than authorized in this permit, or more than the quantities identified in this permit, unless specifically authorized by a written modification hereto;

1.3.3. Failure to conduct permit monitoring as required in Special Conditions 3.1, 3.3.1, 4.7 and 5.1; or

1.3.4. Failure to file reports on fish processing wastes and disposal site monitoring reports as required in the Special Conditions.

1.4. Nothing contained herein shall be deemed to authorize, in any way, the transportation from the United States for the purpose of dumping into the ocean waters, the territorial sea, or the contiguous zone, the following materials:

1.4.1. High-level radioactive wastes;

1.4.2. Materials, in whatever form, produced for radiological, chemical, or biological warfare;

1.4.3. Persistent synthetic or natural materials which may float or remain in suspension in the ocean; or

1.4.4. Medical wastes as defined in § 3(k) of the Act.

1.4.5. Flotables, garbage, domestic trash, waste chemicals, solid waste, or any materials prohibited by the Act or the Marine Plastic Pollution Research and Control Act.

1.5. Nothing contained herein shall be deemed to authorize, in any way, violation of applicable American Samoa Water Quality Standards. The following water quality standards apply:

Table 1. 1989 American Samoa Water Quality Standards: Oceanic Waters [§24.0207(g)(1-7)]. might change

Parameter	Median Not to Exceed the Given Value
Turbidity	0.20 NTU
Total Phosphorus	11.0 µg-P/L
Total Nitrogen	115.0 µg-N/L
Chlorophyll *a*	0.18 µg/L
Light Penetration Depth	150 feet, to exceed the given value 50% of the time.
Dissolved Oxygen	Not less than 80% of saturation or less than 5.5 mg/L. If the natural level of dissolved oxygen is less than 5.5 mg/L, then the natural dissolved oxygen level shall become the standard.
pH	The pH range shall be 6.5 to 8.6 pH units and within 0.2 pH units of the level which occurs naturally.

ASEPA in process of revising stnds now. Check status before permit issued

Should the American Samoa Water Quality Standards applicable to this permit be revised, such revised standards shall apply.

1.6. After notice and opportunity for a hearing, this permit may be revised, revoked or limited, in whole or in part, subject only to the provisions of 40 C.F.R. §§ 222.3(b) through 222.3(h) and 40 C.F.R. § 223.2, as a result of a determination by the Regional Administrator of EPA that:

1.6.1. The cumulative impact of the permittee's dumping activities or the aggregate impact of all dumping activities in the dump site designated in Special Condition 2.2 should be categorized as Impact Category I, as defined in 40 C.F.R. § 228.10(c)(1);

1.6.2. There has been a change in circumstances regarding the management of the disposal site designated in Special Condition 2.2;

1.6.3. The dumping authorized by the permit would violate applicable American Samoa Water Quality Standards;

1.6.4. The dumping authorized can no longer be carried out consistent with the criteria defined at 40 C.F.R. Parts 227 and 228;

1.6.5. The permittee violated any term or condition of the permit;

1.6.6. The permittee misrepresented, or did not disclose all relevant facts in the permit application accurately; or

1.6.7. The permittee did not keep records, engage in monitoring and reporting activities, or to notify appropriate officials in a timely manner of the transportation and dumping activities as specified in any condition of this permit.

1.7. The permittee shall ensure always that facilities, including any vessels associated with the permit, are in good working order to achieve compliance with the terms and conditions of this permit. During all loading operations, there shall not be a loss of fish processing wastes to any waterway. During transport to the disposal site, there shall not be a loss of fish processing wastes to Pago Pago Harbor or the ocean.

1.8. The permittee shall notify the Regional Administrator of any change in the designated fish processing waste transporter at least 30 days before the transfer date. ~~Any change in the designated fish processing waste transporter may be made at the discretion of the Regional Administrator or his delegate. A written request for such a transfer shall be made by the permittee at least thirty (30) days before the requested transfer date. Written approval by the EPA Regional Administrator must be obtained before such a transfer occurs.~~

1.9. The permittee shall allow the EPA Regional Administrator, the Commander of the Fourteenth U.S. Coast Guard District (USCG), the Director of the American Samoa Environmental Protection Agency (ASEPA), and/or their authorized representatives to:

1.9.1. Enter into, upon, or through the permittee's premises, vessels, or other premises or vessels under the control of the permittee, where, or in which, a source of material to be dumped is located or in which any records are required to be kept under the terms and conditions of this permit or the Act;

1.9.2. Have access to and copy any records required to be kept under the terms and conditions of this permit or the Act;

1.9.3. Inspect any dumping equipment, navigational system equipment, monitoring equipment or monitoring methods required in this permit;

1.9.4. Sample or require that a sample be drawn, under EPA, USCG, or ASEPA supervision, of any materials discharged or to be discharged; or

1.9.5. Inspect laboratory facilities, data, and quality control records required for compliance with any condition of this permit.

1.10. Material which is regulated by this permit may be disposed of, due to an emergency, to safeguard life at sea, in locations or in a manner that does not comply with the terms of this permit. If this occurs, the permittee shall make a full report, according to the provisions of 18 U.S.C. § 1001, within 15 days to the EPA Regional Administrator, the USCG and the ASEPA describing the conditions of this emergency and the actions taken, including the location, the nature and the amount of material disposed.

1.11. The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of rights, nor any infringement of Federal, State or local laws or regulations, nor does it obviate the necessity of obtaining State or local assent required by applicable law for the activity authorized.

1.12. This permit does not authorize or approve the construction of any onshore or offshore physical structures or facilities, or, except as authorized by this permit, the conduct of any work in any navigable waters.

1.13. Unless otherwise provided for herein, all terms used in this permit shall have the meanings assigned to them by the Act or 40 C.F.R. Parts 220 through 228, issued thereunder.

2. SPECIAL CONDITIONS - DISPOSAL SITE AND FISH PROCESSING WASTE CHARACTERIZATION

Special conditions are necessary to define the length of the permit period, identify the disposal site location, describe fish processing waste streams and define maximum permitted limits for ~~DAF Sludge, Cooker Juice and Press Liquor~~ for the combined three waste streams (DAF sludge, cooker juice and press liquor) stored in on-shore storage tanks.

2.1. **Location of the Waste Generator and Duration of the Permit**

2.1.1. The material to be dumped shall consist of fish processing wastes, defined in Special Conditions 2.3 and 2.4, generated at the permittee's fish cannery in Pago Pago, American Samoa.

2.1.2. This permit shall become effective on ~~September 1, 1993~~ December 31, 1997 and it shall expire three years from the effective data at midnight on ~~August 31, 1996~~. January 1, 2001.

2.2. **Location of Disposal Site**

Disposal of fish processing wastes generated at the location defined in Special Condition 2.1.1 shall be confined to a circular area with a 1.5 nautical mile radius, centered at 14° 24.00' South latitude by 170° 38.30' West longitude.

2.3. **Description of Fish Processing Wastes**

2.3.1. During the term of this permit, and according to all other terms and conditions of this permit, the permittee is authorized to transport and dispose a maximum of 200,000 gallons per day of fish processing wastes. ~~pumped from a storage tank on the permittee's premises.~~ The fish processing wastes, Dissolve Air Flotation (DAF) sludge, cooker juice and press liquor, are stored in ~~pumped from~~ the permittee's on-shore storage tanks. ~~are authorized for disposal at the designated ocean disposal site. Fish processing wastes pumped into the permittee's onshore storage tanks shall not exceed the following amounts:~~

~~**Table 2. Volumes of Fish Processing Wastes Generated Each Day by StarKist Samoa and Pumped into a Storage Tank before Loading into the Ocean Disposal Vessel.**~~

~~**Fish Processing Waste**~~	~~**Maximum Volume Generated (gallons/day)**~~
~~Dissolved Air Flotation (DAF) Sludge~~	~~30,000~~
~~Cooker Juice~~	~~70,000~~
~~Press Liquor~~	~~100,000~~
~~**Maximum Daily Volume Generated and Pumped into a Storage Tank before Loading into the Disposal Vessel**~~	~~**200,000**~~

2.4. Fish Processing Waste Stream Limits

Fish processing waste stream limits apply to the combined fish wastes of DAF sludge, cooker juice and press liquor, which are co-mingled and stored in an onshore storage tank prior to transport to the ocean disposal site.

~~**Table 3.** Limits for DAF Sludge, Cooker Juice and Press Liquor.~~

~~Physical or Chemical Parameter (units)[a]~~	~~DAF Sludge~~	~~Cooker Juice~~	~~Press Liquor~~
~~Total Solids (mg/L)~~	~~163,430~~	~~114,180~~	~~327,870~~
~~Total Volatile Solids (mg/L)~~	~~136,180~~	~~63,400~~	~~292,280~~
~~5-Day BOD (mg/L)~~	~~232,320~~	~~185,150~~	~~310,790~~
~~Oil and Grease (mg/L)~~	~~64,100~~	~~11,810~~	~~112,080~~
~~Total Phosphorus (mg/L)~~	~~1,640~~	~~940~~	~~3,160~~
~~Total Nitrogen (mg/L)~~	~~7,020~~	~~7,560~~	~~20,360~~
~~Ammonia (mg/L)~~	~~1,830~~	~~690~~	~~1,390~~
~~pH (pH units)~~	~~5.3 to 7.0~~	~~5.9 to 7.0~~	~~5.8 to 7.0~~
~~Density (g/mL)~~	~~0.97 to 1.06~~	~~0.98 to 1.06~~	~~0.99 to 1.08~~

Table 3. Limits for Onshore Storage Tank Fish Wastes

Physical or Chemical Parameter (units)[a]	Storage Tank
Total Solids (mg/L)	
Total Volatile Solids (mg/L)	
5-Day BOD (mg/L)	
Oil and Grease (mg/L)	
Total Phosphorus (mg/L)	

Physical or Chemical Parameter (units)[a]	Storage Tank
Total Phosphorus (mg/L)	
Total Nitrogen (mg/L)	
Ammonia (mg/L)	
pH (pH units)	5.3 to 7.0
Density (g/mL)	0.97 to 1.06

a = All calculated values were rounded to the nearest 10, except density and pH ranges.

2.4.2. Permitted Maximum Concentrations for the onshore storage tank fish waste ~~each type of fish processing waste stream~~ were calculated based on an analysis XX months of ~~historical~~ data from the permittee's previous Special Ocean Dumping Permit, number OD ~~90-0193-01~~. The calculations followed EPA's recommended procedure for determining permit limits as defined in the EPA document titled: "Guidance Document for Ocean Dumping Permit Writers" (January 30, 1988). EPA Region IX will periodically review these limits during the permit to evaluate the accuracy of the limits. If revisions are necessary, EPA Region IX will make changes according to the authority defined in the Ocean Dumping Regulations at 40 C.F.R §§ 223.2 through 223.5.

2.4.3. The Permitted Maximum Concentrations, density range and pH range listed above, shall not be exceeded at any time during the term of this permit.

3. SPECIAL CONDITIONS - ANALYSIS OF FISH PROCESSING WASTES

Compliance with the permitted maximum concentrations defined in Special Condition 2.4 shall be determined by monthly monitoring of the waste in the onshore storage tank. ~~**each of the fish processing waste streams**. Additional analyses of fish processing wastes and reporting requirements are defined in this section. Any fish processing waste stream~~ The sampling dates shall be scheduled within the first two weeks of the month to allow enough time for laboratory analyses and report writing to comply with Special Condition 3.3.

3.1. Analyses of Fish Processing Wastes

3.1.1. Concentrations or values of the parameters listed in Special Condition 2.4 and those listed in the table below shall be determined for the waste in the onshore ~~storage tank each fish processing waste stream. A sample of each fish processing waste stream shall be taken before the individual streams are mixed and pumped into an onshore storage tank. A sample shall consist of three replicate grab~~

~~samples, taken on the day that sampling is scheduled, pooled for use as a composite sample. (NOTE: This section in red was formely Section 3.1.2) In addition to the fish processing waste stream samples taken under Special Condition 3.1.1, the~~ Once a month, the permittee shall analyze samples taken from its onshore fish processing waste storage tank during the transfer of these wastes to the disposal vessel's holding tanks.

~~3.1.2.1~~ 3.1.1.1. Three samples shall be taken from the onshore storage tank transfer line at 10 minute intervals. These samples shall be composited to produce one sample for analysis. The permittee's samples shall not be combined with fish processing waste from any other permittee.

~~3.1.2.2. Samples described in Special Condition 3.1.2.1 shall be taken for 12 months. Samples shall be collected on the same day that samples are taken for analysis under Special Condition 3.1.1 and another sample shall be taken one week later.~~

~~3.1.2.3.~~ 3.1.1.2. The ~~same~~ parameters and detection limits listed in Table 4 shall be analyzed and used for the onshore storage tank composite samples. ~~This sampling and analysis program will provide 2 samples per month for 12 months yielding 24 samples. The detection limits specified in Table 4 shall be used in all fish processing waste stream analyses.~~

Table 4. Physical and Chemical Parameters + detection limits to be Analyzed ~~from~~ of Onshore Storage Tank Waste ~~Individual Samples of DAF Sludge, Cooker Juice and Press Liquor.~~

Parameter	Method Detection Limit
Total Solids	10.0 mg/L
Total Volatile Solids	10.0 mg/L
5-Day BOD	10.0 mg/L
Oil and Grease	10.0 mg/L
Total Phosphorus	1.0 mg/L
Total Nitrogen	1.0 mg/L
Ammonia	1.0 mg/L
pH	0.1 pH units
Density	0.01 g/mL

~~3.1.2. In addition to the fish processing waste stream samples taken under Special Condition 3.1.1, the permittee shall analyze samples taken from its onshore fish processing waste storage tank during the transfer of these wastes to the disposal vessel's holding tanks.~~

~~3.1.2.1. Three samples shall be taken from the onshore storage tank transfer line at 10 minute intervals. These samples shall be composited to produce one sample for analysis. The permittee's samples shall not be combined with fish processing waste from any other permittee.~~

~~3.1.2.2. Samples described in Special Condition 3.1.2.1 shall be taken for 12 months. Samples shall be collected on the same day that samples are taken for analysis under Special Condition 3.1.1 and another sample shall be taken one week later.~~

~~3.1.2.3. The same parameters and detection limits listed in Table 4 shall be analyzed and used for the onshore storage tank composite samples. This sampling and analysis program will provide 2 samples per month for 12 months yielding 24 samples.~~

~~3.1.2.4. The permittee shall send a copy of the analytical data for the onshore storage tank samples to EPA Region IX every 3 months during the 12-month sampling period. EPA Region IX will use these results to calculate limits for the onshore storage tank fish processing wastes. When the onshore storage tank limits are calculated, EPA Region IX will evaluate whether to amend this permit using the new limits.~~

3.1.~~3~~ 2 All sampling procedures, analytical protocols, and quality control/quality assurance procedures shall be performed according to guidelines specified by EPA Region IX. The following references shall be used by the permittee:

3.1.3.1. 40 C.F.R. Part 136, EPA Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act;

3.1.3.2. Tetra Tech, Incorporated. 1985. Summary of U.S. EPA-approved Methods, Standard Methods and Other Guidance for 301(h) Monitoring Variables. Final program document prepared for the Marine Operations Division, Office of Marine and Estuarine Protection, U.S. Environmental Protection Agency. EPA Contract No. 68-01-693. Tetra Tech, Incorporated, Bellevue, Wa.; and

3.1.3.3. Environmental Protection Agency. 1987. Quality Assurance and Quality Control for 301(h) Monitoring Programs: Guidance on

Field and Laboratory Methods. Office of Marine and Estuarine Protection, Washington, D.C. EPA 430/9-86-004.

3.2. **Analytical Laboratory**

3.2.1. Within 30 days of the effective date of this permit, the name and address of the contract laboratory or laboratories and a description of all analytical test procedures and quality assurance/quality control procedures, including detection limits being used, shall be provided ~~for~~ to EPA Region IX ~~approval~~.

3.2.2. Any potential variation or change in the designated laboratory or analytical procedures shall be reported, in writing, ~~for~~ to EPA Region IX ~~approval~~.

3.2.3. EPA Region IX may require analyses of quality control samples by any laboratories employed to comply with Special Condition 3.1 and Appendix A. Upon request, the permittee shall provide EPA Region IX with the analytical results from such samples.

3.2.4. ~~A complete analysis of parameters, required in Special Condition 3.1, shall be made by the permittee and reported to EPA Region IX and the ASEPA whenever there is a significant change in the quality of a fish processing waste stream as determined by EPA Region IX or the ASEPA.~~ Should there be a modification in the permittee's fish processing procedures such that there may be a significant change in the quality of a fish processing waste stream (DAF sludge, ~~pre~~cooker juice or press liquor) EPA Region IX and ASEPA shall be notified 60 days prior to such modification. At their discretion, either agency may require that the permittee conduct a complete analysis of parameters for specified waste streams, and report the results to EPA Region IX and ASEPA. (A sample shall consist of three replicate grab samples pooled for use as a composite sample. The detection limits specified in Table 4 shall be used in all fish procesing waste stream analyses.) If necessary, bioassays may be required in addition to parameter analyses.

→ within 30 days of sampling.

3.3. **Reporting**

3.3.1. The permittee shall provide EPA Region IX, ASEPA, the National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service (USFWS) and the Western Pacific Regional Fishery Management Council (WPRFMC) with a report, prepared every 3 months during the permit period, that contains the following information:

3.3.1.1. Daily volumes of fish processing waste ~~DAF Sludge, Cooker Juice and Press Liquor~~ generated at the permittee's facility and pumped into the permittee's onshore storage tanks ~~to These volumes shall~~ be reported in gallons per day using Form 1 (see Appendix B);

3.3.1.2. Daily volumes of fish processing wastes disposed at the ocean disposal site to. ~~These volumes shall~~ be reported in gallons per day using Form 1 (see Appendix B);

3.3.1.3. Monthly fish processing waste ~~stream~~ analyses from the onshore storage tank demonstrating that the fish processing wastes being dumped comply with the permitted limits of parameters listed in Special Condition 2.4 and a cumulative yearly summary of the volumes of fish processing wastes disposed at the ocean site using Form 2 (see Appendix B);

3.3.1.4. The monthly amount of alum (aluminum sulfate) and coagulant polymer added to the fish processing waste ~~streams~~ reported in pounds per month (see Forms 1 and 2).

3.3.2. Such reports, including a comparison with the permit limits as required on Forms 1 and 2, shall be submitted to EPA Region IX, ASEPA, NMFS USFWS and WPRFMC within 45 days of the end of the preceding 3-month period for which they were prepared. The reports shall be submitted within this time unless extenuating circumstances are communicated to EPA Region IX and the ASEPA in writing. In addition to a hard copy of Forms 1 and 2, the data contained on Form 1 shall be submitted to EPA Region IX on a 3.5" computer diskette in a format compatible with LOTUS version ~~2.2.~~XX??

3.3.3. A summary report of all 3-month reports listed in Special Condition 3.3.1, including a comparisons with permit limits and a detailed discussion of the summary results, shall be submitted by the permittee to EPA and the ASEPA 45 days after the permit expires. All fish processing waste ~~stream~~ data shall be reported in the same format as required in Special Condition 3.3.2.

3.3.4. Upon detection of a violation of any permit condition, the permittee shall send a written notification of this violation to EPA Region IX and the ASEPA within five working days and a detailed written report of the violation shall be sent to the agencies within 15 working days. This notification shall pertain to any permit limits (defined in Special Condition 2.4) that are exceeded, violation of volume limits (defined in Table 2 under Special Condition 2.3.1), and any disposal operation that occurs outside the disposal site defined in Special Condition 2.2.

DO WE STILL NEED BIOASSAYS DONE? No need for remodeling unless boat radically changes or site is different.

~~3.3.5. Eighteen months from the effective date of this special permit, the permittee shall submit a report to EPA and ASEPA on the results of suspended phase bioassay tests and reevaluation of the model used to predict the concentrations of fish processing wastes disposed at the designated site. The suspended phase bioassays shall be conducted using at least one species from each of the following three~~

groups: Group 1 = *Mytilus* sp. (mussel), *Crassostrea* sp. (oyster), *Acartia tonsa* (copepod), or *Trypneustes* sp. (sea urchin) larvae; Group 2 = *Holmesimysis costata* (mysid shrimp) or *Penaeus vannamei* (white shrimp); and Group 3 = *Citharicthys stigmaeus* (speckled sanddab) or *Coryphaena hippurus* (dolphinfish) juveniles.

Appropriate suspended phase bioassay protocols, either protocols approved by EPA or protocols published by the American Society for Testing and Materials (ASTM), shall be followed. Suspended particulate phase bioassays shall be run using the following fish processing waste concentrations: 100%, 75%, 50%, 25%, 10%, 5%, and a control (0%). A minimum of five replicates are required per dilution concentration. Concurrent reference toxicant tests shall be conducted when the suspended phase bioassays are run.

A sampling and testing plan shall be submitted to EPA Region IX and ASEPA by October 1, 1993 for approval before the bioassay tests are conducted. Samples for the suspended particulate phase bioassays shall be composited from the permittee's onshore storage tanks. Three samples shall be taken from the onshore storage tank transfer line at 10 minute intervals. These samples shall be composited to produce one sample for analysis. The permittee's samples shall not be combined with fish processing waste from any other permittee. The permittee shall take samples on the following dates: November 30, 1993, February 28, 1994 and May 31, 1994. Samples shall be collected and shipped to the testing laboratory according to EPA-approved methods to ensure that the samples do not change before the bioassay tests begin. All suspended particulate phase bioassays shall be started within 10 days of sampling.

The testing plan submitted by October 1, 1993 should also include a proposal to reevaluate the disposal site model using results obtained from the new series of suspended phase bioassays. These bioassays are being required to confirm the toxicity of the fish processing wastes and to reevaluate the disposal operations based on the use of a different disposal vessel.

The bioassay and computer model confirmation report shall contain the following information:

3.3.5.1. INTRODUCTION AND PROJECT DESCRIPTION

The project description should include the following information about fish processing waste toxicity, previous bioassay test results, previous modelling at the ocean disposal site, and the design of the new bioassay tests.

3.3.5.2. MATERIALS AND METHODS

Fish processing waste sampling and sample handling procedures should be described or referenced.

References for laboratory protocols for suspended phase bioassay tests.

1) EPA-approved methods and references.

2) Test species used in each test, the supplier or collection site for each test species, and QA/QC procedures for maintaining the test species.

3) Source of seawater used in reference, control and bioassay tests.

4) Data and statistical analysis procedures.

5) Limiting Permissible Concentration (LPC) calculations.

6) Description of model selected to evaluate dispersal of fish processing wastes at the ocean disposal site. Use of this model shall be approved by EPA Region IX and ASEPA before it is used by the permittee to evaluate the fish processing waste disposal plume.

3.3.5.3. DESCRIPTION OF SAMPLING PROCEDURES

QA/QC procedures and actual sampling procedures used during fish processing waste stream sampling and handling of the samples.

3.3.5.4. FINAL RESULTS, ANALYSIS OF DATA AND DISCUSSION

1) Complete bioassay data tables and summary bioassay tables shall be furnished in the report. All data tables should be typed or produced as a computer printout.

2) The permittee shall analyze the bioassay data and calculate the LPC of the material as defined at 40 C.F.R. § 227.27(a-b).

3) The permittee shall use the LPC in the approved plume model to determine the concentration of fish processing wastes disposed at the designated ocean disposal site which complies with EPA's Ocean Dumping Criteria defined at 40 C.F.R. Parts 227 and 228.

3.3.5.5. REFERENCES

This list should include all references used in the field sampling program, laboratory protocols, LPC calculations, modelling analyses, and historical data used to evaluate the fish processing waste disposal operations at the designated ocean disposal site.

3.3.5.6. DETAILED QA/QC PLANS AND INFORMATION

~~The following topics should be addressed in the QA Plan:~~

~~1) QA objectives.~~

~~2) Organization, responsibilities and personnel qualifications, internal quality control checks.~~

~~3) Sampling and analytical procedures.~~

~~4) Equipment calibration and maintenance.~~

~~5) Sample custody and tracking.~~

~~6) documentation, data reduction, and reporting.~~

~~7) Data validation.~~

~~8) Performance and systems audits.~~

~~9) Corrective action.~~

~~10) Reports.~~

4. SPECIAL CONDITIONS - VESSEL OPERATIONS

Specifications for vessel operations are defined to limit dumping activities to the dump site identified in Special Condition 2.2 and to record all dumping activities. The permittee's fish processing wastes and fish processing wastes of other authorized permittees may be loaded into the disposal vessel together or separately.

4.1. Posting of the Permit

This permit, or a true copy thereof, shall be placed in a conspicuous place on any vessel which is used for the transportation and dumping authorized by this permit.

4.2. Vessel Identification

Every vessel engaged in the transportation of fish processing wastes for ocean disposal shall have its name and number painted in letters and numbers at least fourteen (14) inches high on both sides of the vessel. The name and number shall be kept distinctly legible always, and a vessel without such markings shall not be used to transport or dump fish processing wastes.

4.3. Determination of the Disposal Location Within the Dump Site

On each disposal trip, the master of the disposal vessel shall determine the location of the disposal operation as follows:

4.3.1. The disposal vessel, as defined under WASTE TRANSPORTER on page 1 of this permit, shall proceed directly to the center of the disposal site at the location specified in Special Condition 2.2.

4.3.2. The master of the vessel shall observe the conditions at the dump site center, noting the vessel's position (latitude and longitude), wind direction and observed surface current direction.

4.3.3. After the conditions defined in Special Condition 4.3.2 have been recorded, the master of the disposal vessel shall proceed 1.1 nautical miles up current from the center of the disposal site and record the position of the disposal vessel (latitude and longitude). This position shall be the starting point for disposal operations for each disposal trip.

4.3.4. The master of the disposal vessel shall prepare a hard copy ~~(on 8.5 inch by 11 inch paper)~~ of the computerized navigational plot documenting compliance with the procedures defined in Special Conditions 4.3.1 through 4.3.4. The hard copy of the computerized navigational plot for each disposal trip shall be supplied to the permittee. The permittee shall submit these hard copies of the computerized navigational plots with the 3-month reports required under Special Condition 3.3.1. The hard copies of the navigational plots shall include:

4.3.4.1. The disposal vessel's course during the entire dumping operation; and

4.3.4.2. The times and location of entry and exit from the disposal site, position and time of arrival at the center of the disposal site, position and time of arrival at the location 1.1 nautical miles up current from the disposal site, beginning and ending of dumping operations, and disposal vessel position plotted every 15 minutes while dumping operations occur.

4.3.5. The master of the disposal vessel shall sign and date each hard copy of the computerized navigational plots certifying that the hard copies are an accurate record of the disposal vessel's track for each disposal trip.

4.3.6. The master of the disposal vessel shall certify that disposal operations occurred in the manner required by the permit.

4.3.7. The procedures listed in Special Conditions 4.3.1 through 4.3.6 shall be repeated for each disposal trip.

4.4. **Disposal Rate and Vessel Speed**

4.4.1. The disposal vessel/barge shall discharge the material authorized by this permit beginning at the disposal location as determined by Special Condition 4.3.3. The vessel track shall be in a direction that is perpendicular to the current detected at the center of the disposal site as defined in Special Condition 2.2. Disposal shall occur in a oval shape along an axis at least 0.5 nautical miles on either side of the starting point determined in Special Condition 4.3.3. The entire disposal vessel track shall be within the disposal site boundaries.

Condense rewrite

4.4.2. On those ocassions when ocean conditions (e.g. large waves, strong winds, etc.) make it difficult for the vessel to discharge waste in the normal manner (as described in Section 4.4.1) without jeopardizing the vessel, the master of the vessel is allowed to deviate from the normal disposal pattern. If such deviation should occur, he shall describe the adverse conditions in the log and and submit a record of the disposal trip, including the computer-generated navigational plot. All efforts must be made to stay within the disposal site, maximizing the area of disposal within the site, and having the prevailing winds and currents carry the waste away from shore.

4.4.~~1.1.~~ 3. From June 1 through November 30, fish processing wastes shall be pumped from the disposal vessel into the ocean at a rate of 140 gallons per minute per knot, not to exceed 1,400 gallons per minute at a maximum speed of 10 knots.

4.4.~~1.2.~~ 4. From December 1 through May 31, fish processing wastes shall be pumped from the disposal vessel into the ocean at a rate of 120 gallons per minute per knot, not to exceed 1,200 gallons per minute at a maximum speed of 10 knots.

4.5. **Computerized Navigational System**

The permittee shall use an onboard computerized electronic positioning system to fix the position of the disposal vessel accurately during all dumping operations. The computerized navigational system and the method to produce a 8.5 inch by 11 inch hard copy of each disposal trip must be approved by EPA Region IX and the USCG Liaison Office (CGLO) Pago Pago. ~~The permittee shall submit the description, specifications and example hard copy plots for the computerized navigational system at least 15 working days before the effective date of the permit. Disposal operations shall not begin until EPA Region IX and CGLO Pago Pago provide the permittee with written approval for the computerized navigation system and the hard copy plots.~~

4.6. **Permitted Times for Disposal Operations**

Dumping operations shall be restricted to daylight hours, unless an emergency exists as defined at 40 C.F.R. § 220.1(c)(4). ASEPA and CGLO Pago Pago shall be notified immediately if an emergency exists and ocean disposal is required to protect human life at sea. No later than 5

working days after the emergency, the permittee and the waste transporter shall provide EPA Region IX, ASEPA and CGLO Pago Pago with a detailed written report on the emergency situation.

4.7. **Reporting of the Ocean Dumping Vessel Operations**

4.7.1. The waste transporter shall maintain and the permittee shall submit copies of a daily transportation and dumping log, including hard copy plots of all information required in Special Conditions 4.3 and 4.7.2. Copies of the daily logs shall be sent to EPA Region IX, CGLO Pago Pago, and the ASEPA as part of the 3-month report.

4.7.2. The logbook shall contain the following information for each disposal trip:

4.7.2.1. Permit number, date and consecutive trip number;

4.7.2.2. Record of contact with ASEPA and CGLO before each trip to the ocean disposal site.

4.7.2.3. The time when loading of the vessel commences and ceases in Pago Pago Harbor;

4.7.2.4. The volume of fish processing waste loaded into the disposal vessel from each fish cannery;

4.7.2.5. The time and navigational position that dumping commences and ceases;

4.7.2.6. A record of vessel speed and direction every 15 minutes during each dumping operation at the disposal site, and a hard copy of the vessel's course defined in Special Condition 4.3;

4.7.2.7. Discharge rate from the disposal vessel.

4.7.2.8. Observe, note and plot the time and position of any floatable material;

4.7.2.9. Observe, note and plot the wind speed and direction every 30 minutes while dumping fish processing wastes at the designated disposal site;

4.7.2.10. Observe and note current direction at the beginning and end of the disposal trip, and the direction of the disposal plume at the end of the disposal operation;

4.7.2.11. Observe, note and plot the presence of the previous disposal plume and any unusual occurrences during the disposal trip, or any other information relevant to the assessment of environmental impacts as a result of dumping activities; and

4.7.2.12. Any unusual occurrences noted under Special Condition 4.7.2.9 shall be highlighted in the report defined in Special Condition 3.3.1.

4.7.2.13. Any deviation from the normal disposal pattern such as circumstances described in Special Condition 4.3.8 and reasons for the deviation. Section 4.4.2.

5. SPECIAL CONDITIONS - DUMP SITE MONITORING

The monitoring program for disposal of fish processing wastes in the ocean must document effects of disposed wastes on the receiving waters, biota, and beneficial uses of the receiving waters; compliance with EPA's Ocean Dumping Regulations; and determine compliance with permit terms and conditions. Revisions to the monitoring program may be made under the direction of EPA Region IX at any time during the permit term, in compliance with 40 C.F.R. §§ 223.2 and 223.3. This may include a change in the number of parameters to be monitored, the frequency of monitoring, the location of sample stations, or the number and size of samples to be collected.

Implementation of the disposal site monitoring program and all segments of the monitoring program specified in Special Condition 5 and Appendix A shall be the responsibility of the permittee.

5.1. Monitoring Program

The permittee shall conduct the monitoring program, defined in Appendix A, to determine the environmental impacts of ocean dumping of fish processing waste. If possible, monitoring cruises shall be scheduled within the first two weeks of each month to allow enough time for laboratory analysis and report writing in compliance with Special Condition 5.2. The permittee shall notify the ASEPA at least 48 hours before any scheduled monitoring activities.

5.2. Monitoring Reports

Monthly site monitoring reports shall be submitted to EPA Region IX, the ASEPA, NMFS, USFWS and WPRFMC with the 3-month reports as specified in Special Condition 3.3.2. The reports shall include: neatly compiled raw data for all sample analyses, quality assurance/quality control data, statistical analysis of sample variability between stations and within samples for each parameter, and a detailed discussion of the results.

5.3. Final Summary Report

5.3.1. A report shall be submitted to EPA Region IX, ASEPA, NMFS, USFWS and WPRFMC 60 days after the permit expires. This report shall summarize all of the data collected to characterize fish processing wastes and the results of the dump site monitoring program specified in this special permit.

5.3.2. At a minimum, the summary report shall contain the following sections:

5.3.2.1. Introduction (including a summary of previous ocean disposal activities),

5.3.2.2. Location of Sampling Sites,

5.3.2.3. Materials and Methods,

5.3.2.4. Results and Discussion (including comparisons and contrasts with previous MPRSA § 102 research and special permit data related to disposal of fish processing wastes off American Samoa),

5.3.2.5. Conclusions; and

5.3.2.6. References.

5.4. **Quality Assurance/Quality Control**

5.4.1. All appropriate phases of the monitoring, sampling, and laboratory analytical procedures shall comply with the EPA Region IX-specified protocols and references listed in Special Condition 3.1.2.

5.4.2. The qualifications of the on-site Principal Investigator in charge of the field monitoring operation at the dump site shall be submitted to EPA Region IX and the ASEPA for approval whenever a new Principal Investigator is retained ~~before the initial monitoring cruise.~~ Notification of any change in this individual shall be submitted to EPA Region IX and ASEPA at least 7 days before the cruise is scheduled.

6. **SPECIAL CONDITIONS - NOTICE TO REGULATORY AGENCIES**

6.1. **Notice of Sailing to the U.S. Coast Guard Liaison Office and the American Samoa Environmental Protection Agency**

6.1.1. The waste transporter shall provide telephone notification of sailing to CGLO Pago Pago at 633-2299 and the ASEPA at 633-2304 during working hours (7:00 a.m. to 3:30 p.m.) no later than 24 hours before the estimated time of departure for the dump site defined in Special Condition 2.2. A record of contact with both agencies shall be reported with other information for each disposal trip.

6.1.2. The waste transporter shall immediately notify CGLO Pago Pago and the ASEPA upon any changes in the estimated time of departure greater than two hours.

6.1.3. Surveillance of activities at the dump site designated in Special Condition 2.2, may be accomplished by unannounced aerial overflights or observation from another vessel by ASEPA, USCG or American Samoa Department of Public Safety personnel, or a USCG shiprider and/or a ASEPA shiprider who will be on board the towing/conveyance vessel for the entire voyage. Within two hours after receipt of the initial notification the waste transporter will be advised whether or not a shiprider will be assigned to the waste transporter's disposal vessel.

6.1.4. The following information shall be provided to CGLO Pago Pago and the ASEPA in the notification of sailing defined above:

6.1.4.1. The time of departure,

6.1.4.2. Estimated time of arrival at the dump site,

6.1.4.3. Estimated time of departure from the dump site, and

6.1.4.4. Estimated time of return to port.

6.2. **Reports and Correspondence**

6.2.1. Two copies of all reports and related correspondence required by General Condition 1.10, Special Conditions 3.2, 3.3, 4.3, 4.5, 4.6, 4.7, 5.2, 5.3, 6.1, and all other materials, including applications shall be submitted to EPA Region IX at the following address:

Office of Pacific ~~Island and Native American Programs (E-4)~~Insular Area Programs (CMD-5)
U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, California 94105-3901
Telephone (415) 744-1599

6.2.2. One copy ~~Two copies~~ of all reports required by General Condition 1.10 and Special Conditions 4.5, 4.6, 4.7 and 6.1 sent to the U.S. Coast Guard shall be submitted to the following address:

Commanding Officer
U.S. Coast Guard Liaison Office
P.0. Box 249
Pago Pago, American Samoa 96799
Telephone (684) 633-2299

6.2.3. One copy ~~Three copies~~ of all reports required by General Condition 1.10 and Special Conditions 3.2, 3.3, 4.3, 4.5, 4.6, 4.7, 5.2, 5.3, and 6.1 sent to the American Samoa Environmental Protection Agency shall be submitted to the following address:

Director
American Samoa Environmental Protection Agency
Office of the Governor
Pago Pago, American Samoa 96799
Telephone (684) 633-2304

6.2.4. One copy of the all reports required by Special Conditions 3.3, 5.2 and 5.3 shall be sent to the USFWS, the NMFS and the WPRFMC at the following addresses:

Project Leader
Office of Environmental Services
U.S. Fish and Wildlife Service
300 Ala Moana Boulevard
P.0. Box 50167
Honolulu, Hawaii 96850

Western Pacific Program Officer
National Marine Fisheries Service
2570 Dole Street
Honolulu, Hawaii 96822-2396

Executive Director
Western Pacific Regional Fishery Management Council
1164 Bishop Street, Suite 1405
Honolulu, Hawaii 96813

Signed this _____ day of _____, 1993

For the Regional Administrator:

_____
~~Harry Seraydarian, Director~~Alexis Strauss, Acting Director
Water ~~Management~~ Division
U.S. EPA, Region IX

APPENDIX A

SPECIAL OCEAN DUMPING PERMIT OD ~~93-0197-01~~
OCEAN DUMP SITE MONITORING PLAN

7. MONITORING OF RECEIVING WATER

Monitoring of the receiving waters at the disposal site defined in Special Condition 2.2 shall be the responsibility of the permittee. Funding and cooperation for site monitoring may be accomplished through an agreement between permittee and other permittees authorized to use the disposal site. Any agreements negotiated between the permittee and other authorized permittees shall be the sole responsibility of the permittee named in this permit. EPA Region IX requires that a monitoring program be developed that complies with the special conditions defined below.

During each monitoring cruise, the disposal plume from the disposal vessel shall be sampled by taking discrete water samples for the measurement of parameters listed in Special Condition 7.2.4. ~~Results of the first 3-month monitoring report will be evaluated by EPA Region IX to determine whether portions of Special Conditions 7 and/or 8 will be revised. The evaluation will be based on documented sampling results and recommendations by the permittee(s).~~

7.1. Location of Water Sampling Stations

7.1.1. On each sampling cruise, the latitude and longitude of all sampling stations shall be determined and plotted using an acceptable navigational system.

7.1.2. The Principal Investigator shall ensure that discrete water samples are taken at the locations marked in Figure 1.

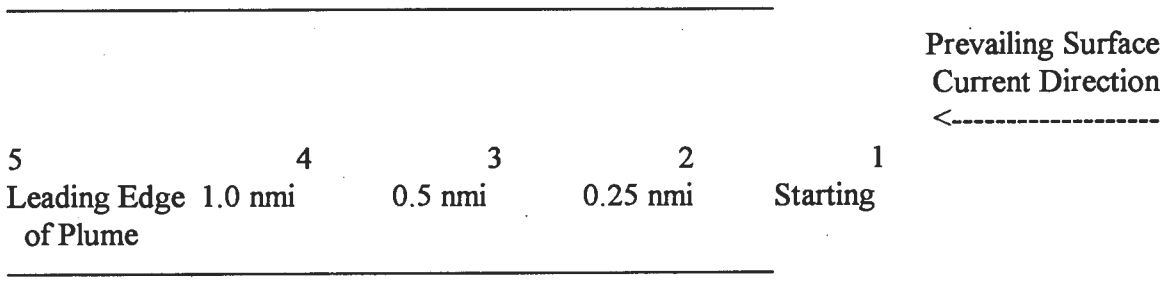


Figure 1. Orientation of Sample Stations (Top View) in the Middle of the Discharge Plume Visually Identified at the Time of Sampling.

7.1.3. The following stations, defined in Figure 1, shall be sampled on each sampling cruise:

7.1.4.1. Station 1 shall be the starting point of the dumping operation as determined in Special Condition 4.3.

7.1.4.2. Station 2 shall be 0.25 nautical miles (nmi) down-current from Station 1.

7.1.4.3. Station 3 shall be 0.5 nmi down-current from Station 1.

7.1.4.4. Station 4 shall be 1.0 nmi down-current from Station 1.

7.1.4.5. Station 5 shall be at the leading edge of the discharge plume, but within the plume.

7.1.4. The Principal Investigator shall ensure that each sampling station is positioned as close as possible to the middle of the discharge plume according to his/her best professional judgment.

7.2. Water Column Characteristics to Be Measured

7.2.1. Discrete water samples at Stations 1, 2, 3, 4, and 5 shall be taken at depths of 1, 3, and 10 meters from the surface at the middle of the plume visually identified by the Principal Investigator.

7.2.2. Surface water conditions shall be recorded at all stations including:

7.2.2.1. Wind speed and direction;

7.2.2.2. Current direction and wave height; and

7.2.2.3. Observations of plume color (e.g., Forel-Ule color scale), odor, floating materials, grease, oil, scum, and foam.

7.2.3. Water samples shall be obtained using a self-closing 3-liter water sample device at each depth listed in 7.2.1.

7.2.4. Water column parameters analyzed from discrete samples taken at the depths listed in 7.2.1 shall include:

Table 4. Physical and Chemical Parameters to be Analyzed from Water Samples Taken at the Ocean Disposal Site.

Parameter[a]	Method Detection Limit
Total Suspended Solids	10.0 mg/L
Total Volatile Suspended Solids	10.0 mg/L

Parameter[a]	Method Detection Limit
Oil and Grease	10.0 mg/L
Total Phosphorus	1.0 mg/L
Total Nitrogen	1.0 mg/L
Ammonia	1.0 mg/L
pH	0.1 pH units

a = Samples should be acidified to pH <2 with sulfuric acid and refrigerated a 4°C until analysis.

7.2.5. Temperature measurements shall be taken at depths of 1, 3, and 10 meters at the starting point of the disposal operation, as defined in Special Condition 4.3.3.

7.3. **Frequency of Sampling**

7.3.1. Water samples shall be collected when dumping operations occur. Each station listed under Special Condition 7.1 shall be sampled once each month. These samples shall be used to characterize the receiving waters at the disposal site.

7.3.2. Control samples shall be taken at Station 1 before dumping activities.

7.3.3. Station 1 shall be sampled at a point within the plume immediately after discharge operations cease.

7.3.4. Stations 2 through 5 shall be sampled consecutively at distances indicated in Special Condition 7.1.4 to allow efficient sampling of the discharge plume. The time between each sample and the sampling location, beginning with the control sample and ending with the sample collected at the leading edge of the plume, shall be recorded.

7.4. **Water Quality Criteria and Standards**

7.4.1. The Limiting Permissible Concentration (LPC) of the liquid phase of the fish processing wastes shall not be exceeded at the disposal site boundary four hours after disposal operations cease. (QUESTION: IS IT AT THE DISPOSAL SITE BOUNDARY OR WITHIN THE BOUNDARIES FOUR HOURS AFTER DISPOSAL OPERATIONS? MY READING OF THE REGS IS "WITHIN") The LPC, as defined at 40 C.F.R. §227.27,shall not exceed applicable American Samoa Oceanic Water Quality Standards (see Table 1). EPA Region IX and the ASEPA will evaluate the LPC based on EPA's Ocean Dumping

Regulations and the concentration of parameters measured at the stations sampled during the tenure of this permit.

8. MONITORING OF BIOLOGICAL COMMUNITIES

8.1. Pelagic Resources

8.1.1. All sightings of fish, sea turtles, sea birds, or cetaceans near the disposal site shall be recorded including:

8.1.1.1. Time, location and bearing;

8.1.1.2. Species name(s); and

8.1.1.3. Approximate number of individuals.

New / Revised previous form

APPENDIX B - REPORT FORM 1

Monthly Volumes of StarKist Samoa Fish Processing Wastes Generated Per Day and Volumes of Fish Processing Waste Disposed at the Ocean Site

Daily Limit Not to Exceed 200,000 gallons/day

Month _____ 19__

Date	Total Generated (gallons/day)	Volume Ocean Disposed (gallons/day)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		

Date	Total Generated (gallons/day)	Volume Ocean Disposed (gallons/day)
25		
26		
27		
28		
29		
30		
31		
TOTAL		

NOTE: An asterisk (*) to the right of the fish processing waste volume signifies that a violation of the permit limit has occurred. The number of violations are shown in the Monthly Totals row.

Monthly quantities of alum (aluminum sulfate) and coagulant polymer added to the fish processing waste streams:

Aluminum sulfate: _____ pounds/month

Coagulant polymer: _____ pounds/month

APPENDIX B - REPORT FORM 2
Data Form for 3-Month Report on Waste Stream Analyses for StarKist Samoa MPRSA § 102 Permit #OD 93-01

Replace with my spreadsheet form

Reporting Period: From _____ 19__ To _____ 19__

StarKist Samoa - On-Shore Storage Tank Waste

Month & Year	Total Solids (mg/L)	Total Volatile Solids (mg/L)	5-Day Biological Oxygen Demand (mg/L)	Oil and Grease (mg/L)	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)	Ammonia (mg/L)	pH (pH units)	Density (g/mL)
OD 97-01 Permit Limits	XXXXXXX	XXXXXXX	XXXXXXXX	XXXXXXXX	XXXXXXX	XXXXXXX	xxxxxxx	5.3 to 7.0	0.97 to 1.06

*Note an asterisk (*) next to the waste concentration signifies that a violation of the permit limit has occurred.

New Revised previous Sam

Cumulative Yearly Data on Fish Processing Wastes Generated at StarKist Samoa's Plant and Disposed at the Ocean Site.
MPRSA §102 Special Permit #OD 97-01

Reporting Period:
From _____ 19__
To _____ 19__

Month & Year	Total Generated (gallons/month)	Aluminum sulfate (pounds/month)	Coaglant polymer (pounds/month)	Volume Ocean Disposed (gallons/month)	Volume Ocean Disposed (gallons/month)
Cumulative Yearly Totals					

NOTE: A separate table shall be prepared for each calendar year.

Allan - FYI. RA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105
OFFICE OF PACIFIC ISLAND PROGRAMS

DATE: 1/29/97 PAGES (incl. cover) :13

TO: Dr. Mohamed A. Abedelrhman, Research Physical Scientist
Ecosystems Analysis and Simulation Branch, AED

FAX: ~~415~~ 401/782-3030

FROM: Pat Young
FAX: 415/744-1604 Phone: 415/744-1594
E-mail: young.patricia@epamail.epa.gov

Re: Transmittal of Steve Costa's Proposed Changes to Modeling Report

---

Attached are Steve Costa's proposed changes to the canneries' ocean disposal modeling report. We would appreciate your review. Please call Allan Ota at (415) 744-1980 or me if we need to discuss. We know you've spent a lot of time on this and appreciate your thoroughness so we hope your concerns are now being addressed and we can move on to Steve completing the report (and hopefully we will still be on track to issue the permit by April).

Thanks again for your help.

Pat

I'm attaching Steve's memo (10 pages) and Attachment 2 (2 pages). I'm not including Attachment 1 as that's your latest memo.

Rcd 1/28/97

gdc

24 January 1997

Pat Young
American Samoa Project Manager
Environmental Protection Agency - Region 9
75 Hawthorne Street
San Francisco, CA 94105-3901

Dear Pat:

Attached is a memorandum describing our proposed changes to the modeling section of the report in response to Dr. Abdelrhman's second set of comments (actually responding to our responses to his first set of comments). To put this whole matter in perspective the following points are important:

1. I believe that we agree on technical aspects of the dumping dilution.

2. I believe that we agree on technical aspects of the nearfield dilution.

3. I believe that we agree on the technical aspects of the farfield model but may not fully agree on the manner in which this model was matched to the nearfield model or implemented in the disposal zone.

4. Full agreement on the farfield model is not particularly important since, even if we throw that model out and discount farfield dilution, the regulatory requirement of LPC = $0.01(LC_{50})$ is generally achieved by the end of nearfield dilution, and even in the worst possible case requires a farfield dilution of only less than 3:1. If we extend the nearfield dilution calculations past the arbitrary cutoff of 1000 feet, farfield dilution is not required, even in the worst possible case.

5. I believe a full scale field investigation capable of calibrating and validating the model(s) is not required. The overall model predictions can be check against the monthly monitoring data. A preliminary review of a small part of that data indicates that conditions in the disposal area during disposal can be characterized adequately to address regulatory questions with the monitoring data that is already required and existing.

As a final note, I think we have a very good idea of Dr. Abdelrhman's principal concerns and have addressed them adequately. I suggest we go ahead and finish our revisions to the report and allow him to see the revised product before any additional exchanges of comments and responses. We are now, it seems to me, at the point of editorial and style preferences (e.g. what graphical material is appropriate) and have addressed all of the technical matters. If Dr. Abdelrhman has any questions he is welcome to call me directly or if you believe a conference call is in order I am available at your convenience.

Sincerely,

Steve Costa

cc: distribution on enclosed memo

P.O. BOX 1125 • ARCATA, CA • 95518-1125
PHONE: 707-826-0717/7662 • FAX: 707-822-0567

MEMORANDUM

To: Pat Young/USEPA Region IX

From: Steve Costa/[redacted]

Subject: Ocean Dumping Studies - EPA Comments Round 2

Date: 24 January 1997

cc:

Norman Wei/StarKist Foods	Barry Mills/StarKist Samoa
Jim Cox/Van Camp Seafood	Bill Perez/VCS Samoa Packing
Karin Noack/CH2M HILL/SFO	Sheila Wiegman/ASEPA
Kyle Winslow/CH2M HILL/SFO	David Wilson/CH2M HILL/SEA

This memorandum is in response to Dr. Abdelrhman's memorandum of 20 December 1996, in which he commented on our responses to his initial review comments and concerns. As noted in the cover letter and in the memorandum, there are still a few unresolved issues, which are discussed in detail below. However, I will first address Dr. Abdelrhman's two main recommendations, presented at the bottom of page 1 of his memorandum. I believe my comments on his recommendations will clear up some apparent misconceptions on both my part and Dr. Abdelrhman's.

Response to Recommendation No.1 - Acceptability of Report

His first recommendation is: **"(1) Region 9 should not accept this report until the requested revisions and/or explanations are provided by the contractor to EPA."** I interpret from this that Dr. Abdelrhman is under the impression that I and/or CH2M HILL is producing this report as an *"contractor to EPA"*. This is not the case and this report is not an EPA product that is going to be published as an EPA document. The document was produced in response to a permit condition (3.3.5) that reads:

> *" ... the permitteee shall submit a report to EPA and ASEPA on the results of suspended phase bioassay tests and the reevaluation of the model used to predict the concentrations of fish processing wastes disposed at the designated site."*

The permit requires a study plan for approval by EPA and ASEPA and lists some specific requirements as to content of the report. The permit is very clear as to the purpose of the bioassays and the model reevaluation:

"These bioassays are being required to confirm the toxicity of the fish processing wastes and to reevaluate the disposal operations based on the use of a different disposal vessel."

The report, as originally presented, substantially fulfills the requirements of the permit condition. Dr. Abdelrhman's initial comments seemed to me to be somewhat more comprehensive, and in many cases more editorial, than I would expect in the context in which the report was submitted. However, given that Dr. Abdelrhman was apparently looking at the report from different context, that of a work product being produced for publication by EPA, by an EPA contractor, I now understand the tenor and thoroughness of his comments. I also suspect the Dr. Abdelrhman is not fully familiar with all of the previous work that has been done evaluating the ocean disposal area since it was originally permitted in 1980.

Our evaluation of the previous modeling can be summarized fairly succinctly: after examination of the previous work, and considering the characteristics of the new disposal vessel (counter- rotating twin screw propulsion with waste introduced between the screws), the most significant shortcoming of the previous model was that it very likely substantially underpredicted the initial dilution. To address the implications of our evaluation in more detail we developed an approach that we consider somewhat less conservative than the original model predictions (conservative = underpredicting dilution). We were not attempting to describe the fate of the waste in great detail or in a rigorously definitive fashion, only to provide estimates sufficient for planning and regulatory decision making - thus always keeping our assumption "conservative". This was, we believe, the intent of the permit condition, and the initial report was consistent with this intent.

The above comments notwithstanding, we are appreciative of the thoroughness and insight with which the report was reviewed. The permittees and the authors of the report wish to cooperate with and work with EPA and thus will make every reasonable effort to address each of the comments and concerns of Dr. Abdelrhman and EPA Region 9 staff. Based on the most recent memorandum from Dr. Abdelrhman (provided as Attachment 1 to this memorandum) it seems that our responses and proposed actions to his first set of comments generally addressed his concerns with a few still unresolved exceptions that are discussed in more detail below. Therefore, we propose to reissue the report with the changes stated in our previous memorandum of 24 October 1996 and also incorporate those changes described in more detail below. We believe the changes and responses suggested are more than sufficient for the purposes of satisfying the permit condition and providing the information needed by EPA and ASEPA .

Response to Recommendation No. 2 - Field Validation

Dr. Abdelrhman's second major recommendation is: **"(2) Region 9 should support the conduct of a field study to validate the model results"**. Again, his wording and implication (e.g. "support the conduct of a study"), is that this is an EPA supported study and not a permit condition being carried out by the dischargers. This disposal site has been

intensively studied as described by the various references in the report. In addition, a monthly monitoring program is required by Special Conditions 7 of the permit, and implemented by the canneries, to determine the effectiveness of the disposal operation and ascertain compliance with American Samoa Water Quality Standards (ASWQS).

The field study suggetsted by Dr. Abdelrhman appears to be aimed at developing data to calibrate and verify (validate) the model. I believe such an effort is unrealistic and unnecessary. It is unrealistic because the logistics required to perform such a study in American Samoa would be extremely difficult to deal with. It is an unnecessary effort because we feel that the monitoring that is already required, is sufficient to protect the beneficial uses and the environment of the offshore area. I will address both of these issues and then suggest and alternative to such a study below.

The only definitive manner to collect data that could be used to calibrate/validate the model(s) would be to conduct a tracer dye study. At least three elements of this study would be unrealistically difficult to conduct in American Samoa:

1. One or more current meter arrays would have to be deployed in water depths of approximately 9000 feet. (Although near surface currents are of interest, a bottom mooring would be required. Note that moorings would also be required for ADCP meters in order to capture the surface currents - vessel mounted meters would not provide the required information.) The installation of such meters would require a deep water oceanographic vessel - there is no appropriate vessel or equipment in or near American Samoa. The cost of renting such a vessel, even if it were to be available, would be prohibitively expensive.

2. Since it would be required to measure very high dilutions to calibrate/validate the model(s), a dye study is the only way such data could be obtained. The ocean dumping vessel capacity is 200,000 gallons. To tag this waste with a dye such as Rhodamine WT would require the following volumes of dye (Table 1) to detect various dilutions associated with the various models (given the high sediment and organic content of the waste more dye than usual will be required - 4 ppb is assumed to be a reasonable detection limit for this case):

Table 1
Estimated Dye Volumes

Model	Nominal Total Dilution	Dye Required at 4 ppb	Cost of Dye at $1400/5 gal
Dumping Dilution	1,000:1	0.08 gallons	-
Nearfield Dilution	40,000:1	3 gallons	-
Farfield Dilution (minimum)	400,000:1	30 gallons	$8400.00
Farfield Dilution (maximum)	2,500,000:1	180 gallons	$50,000.00

3. Multiple vessels (three would be a reasonable number) would be required to operate in the open ocean to measure the dye. It would be difficult to find three appropriate vessels in American Samoa willing to do such work.

The canneries have been implementing a monthly monitoring program as described in their permits. This program requires the collection of water samples at various locations and depths in the discharge plume and subsequent laboratory analysis for a suite of water quality parameters. Such a program is required regardless of the predictions of the previous modeling which was used to site and size the disposal zone. This monitoring is essentially a general check on the previous model predictions and provides information to assess compliance with ASWQS. From a regulatory view point, such a monitoring program is the practical and reasonable equivalent of model validation.

The monitoring data are not designed or suitable for rigorous model calibration since the achievable detection limits, accuracy, or precision, of the measurements cannot approach the requirements to check the various dilution predictions. In addition, the field measurements are not, in general, made on the same day that similar monitoring is done on the material to be discharged. However, the data could be used in a general fashion (knowing typical or average discharge and receiving water values for particular parameters) to provide a general assessment of the effectiveness of the disposal operation. In particular, the overall nearfield dilutions observed in this data could be characterized and compared to the model predictions. If this would suffice, in lieu of Dr. Abdelrhman's recommendation for a field study, we could include this type of analysis in the revised report.

Responses to Comments on Unresolved Issues

The following table summarizes the status of comments and responses using my original organizational scheme for responding to Dr. Abdelrhman's initial comments and which he so kindly followed in his second memorandum. In the Table the status column is interpreted as follows:

"A" means that our initial response and proposed action is acceptable to Dr. Abdelrhman;

"OK" means that out initial response combined with Dr. Abdelrhman's follow-up comment is acceptable to both him and us (in view of any comments also in the table);

"RI" indicates that this is a remaining issue that is still unresolved and is discussed in more detail following the Table. Each of the remaining issues (RI's) are discussed following the table.

Table 2 Status of Comments and Responses					
Page	**¶**	**[#]**	**•**	**Status**	**Comments**
1	1			A	
1	2	[1]		OK	
			•	OK	
			•	OK	
			•	A	
		[2]		OK	
		[3]		OK	
		[4]		RI	A & OK for dumping dilution, issue is nearfield dilution
		[5]		A	
		[6]		RI	General comment on overall report acceptability, see above discussion
		[7]		A	
2	1		•	A	
			•	A	
			•	RI	See discussion concerning field study above
			•	RI	Question concerns number of figures to include in report
			•	A	
2	2	[1]		OK	
			•	A	
			•	A	
			•	A	
		[2]		RI	Same as above concerning number of graphics
		[3]		A	
		[4]		A	
2	3			A	
2	4	[1]		A	
		[2]		A	
		[3]		A	
		[4]		A	
		[5]		A	
		[6]		A	
		[7]		RI	Same as above concerning overall acceptability of report
		[8]		OK	
2	5	[1]		RI	Velocities to be used in plume calculations
			•	-	(Included above)
			•	-	(Included above)
			•	-	(Included above)
		[2]		RI	Seasonality of dumping dilutions
		[3]		A	
		[4]		RI	Values of nearfield dilutions (related to 2:5:#[1] above)

Table 2 - continued Status of Comments and Responses					
3	1			A	
3	2	[1]		RI	Conservative assumptions and Distance to edge of dump zone
		[2]		RI	Conservative assumptions and Distance to edge of dump zone
		[3]		RI	Conservative assumptions and Distance to edge of dump zone
3	3			A	
3	4		•	OK	
			•	A	
			•	A	
			•	A	
			•	A	
Editorial Comments on marked Pages					
			•	A	
			•	A	
			•	RI	Definition of H
			•	RI	Value for C_0
			•	A	
			•	OK	
			•	-	Four points by Dr. Abdelrhman relating to Tables 4.1 and 4.2
			1	RI	Disposal rate needs correcting - my mistake
			2	RI	Disposal rate needs correcting - my mistake
			3	RI	Values of nearfield dilutions (related to 2:5:#[1] above)
			4	RI	Location assumed for dumping
			5	OK	
Additional Information					
			•	A	
			•	A	
			•	OK	
			•	RI	Units question for particular equation

Nearfield Plume Velocity

There is no disagreement on the following point: the appropriate velocity to use to model dilution (actually entrainment and mixing processes) is the relative velocity between the plume and the ambient water mass. We will change the equation on 3-6 to reflect flow rather than velocity, change the nomenclature on page 3-7 to indicate that the initial velocity is the velocity of the plume relative to the ambient water, and make any corrections required to the dilution calculations to reflect that only this velocity was used.

General Report Acceptability

This issue is discussed in detail above. We believe all issues have been adequately addressed by the previous response to comments and the additional information provided here. We suggest that Dr. Abdelrhman review this memo and if there are still issues in his mind we can discuss them and accommodate his views in the report.

Need for Field Study

This issue is also covered in detail above and we have provided a recommendation for assessing the model predictions using the monthly monitoring data. We believe this is a reasonable approach as it would directly assess compliance with ASWQS, which is the overall regulatory intent.

Number of Figures Needed

We had previously indicated that we would provide some summary figures for the results, this suggestion was "unacceptable". We will include the following figures:

1. A schematic showing the dumping dilution (propeller stream) configuration

2. A schematic showing the nearfield dilution, transition, and farfield dilution zones

3. A figure or two showing the dilution versus distance through the dilution zones

We will be glad to consider any additional figures that Dr. Abdelrhman deems appropriate if he will provide us with a description or sketch of what he has in mind.

Seasonality of Dumping Dilutions

We agree that the only seasonal differences in dumping dilution are in the disposal rate. The source of confusion here is simple transposition (my mistake) in values in Tables 4.1 and 4.2. Although, I indicated in the previous response that revised tables were being provided, it seems that corrected tables were not provided (again my mistake). - Correct Tables 4.1 and 4.2 are provided as Attachment 2 to this memorandum.

Location of Dumpsite

Dr. Abdelrhman believes that the navigation of the vessel is a potential problem and that we should use a shorter distance to the edge of the dumpsite to maintain a conservative approach. We disagree. The vessel navigation is done using GPS (and a plot is generated on each drip to the disposal site). Potential errors in navigation are on the order of 100 feet not 6000 feet (1 nautical mile) as postulated by Dr. Abdelrhman. We have checked our small hand held GPS at surveyed bench marks around Pago Pago Harbor a number of times. Satellite coverage is generally excellent and we typically recover our positions with a few tens of feet - the ship's unit is certainly better than our hand held unit. In addition, using GPS and with a knowledgeable crew (which is the case here) current direction is

relatively easy to determine. Finally, the information needed to assess the effects of dumping at various distances from the edge of the site is provided in the Appendix 10.

Definition of H

The initial plume dimension in the FEIS model is characterized by a dimension H (vertical extent of the plume at the beginning of initial dilution) where H/4 is the distance from the surface to the point of C_{max} and is a vertical dimension used to account for the effect of vertical diffusion in the farfield model. We will revise the text to make the definitions consistent (unclear on pages 3.2 and 3.3). Also, as described in a previous response there is not a smooth connection between the nearfield and farfield plumes - the transition region is ignored (see Page 3-Paragraph 2-Number [1]: comment in which Dr. Abdelrhman requested that we include the explanation provided in our initial response into the report). Therefore, H as used in the farfield model is the dimension applicable at the beginning of the farfield calculations - but may not match the dimension at the end of the nearfield calculations. I believe the figure we have agreed to include could clarify this point. In general the connection between farfield and nearfield is not very rigorous. We are using the farfield model as an estimate of the additional dilution one might expect in the dumping zone following nearfield dilution. This approach is taken since, from a regulatory perspective, the combination of dumping and nearfield dilution is sufficient and any subsequent farfield dilution is considered a safety factor. We will explain the connections and assumptions between the two models in more detail and investigate the possibility of matching the models more rigorously. Alternatively, we may treat the farfield more qualitatively and simply present that approach in the revised report. Either should adequately respond to the concerns of Dr. Abdelrhman.

Value of C_0

This appears to be a point on which agreement may not be reached or, more likely, already exists and there is simply some confusion. Dr. Abdelrhman states that a numerical value of C_0 must be explicitly stated in order to perform the farfield modeling. Since the farfield model only predicts the ratio C_{max}/C_0 (i.e. the inverse of dilution on the centerline of the plume) there is no need to explicitly state a numerical value unless such a value is needed to directly assess water quality standards or criteria. In the case of this study, the comparison to be made is with the results of bioassay tests, the results of which are expressed in terms of percent concentration (not absolute concentration) which is the equivalent of dilution. However, to address his comment in more detail the following should be considered:

[1] C_{0ff} (initial concentration in the farfield) is not defined in the FEIS model by either of the equations mentioned but rather the value at the end of the nearfield dilution,

[2] the concentration of the "whole effluent" from the barge can be calculated numerically as the inverse of dilution at any point in the plume trajectory and the concentration of a constituent of the waste can be easily calculated knowing the

concentration of whole waste at any point and the initial concentration of the constituent of interest, and

[3] the C_0 in Tables 4.1 and 4.2 is a generic concentration "in the barge" and not the same C_0 at the beginning of the farfield processes (this is confusing and will be fixed).

In addition the original Tables 4.1 and 4.2 showed C in g/l not mg/l and the revised tables include this correction. Although I indicated in the previous response that revised tables were being provided, it seems that corrected tables were not provided (again my mistake). Correct Tables 4.1 and 4.2 are provided as Attachment 2 to this memorandum.

Units - Equations on page 3.7

For this equation K_0 is dimensionless and the variables must have consistent units regardless of what they are. The previous set of equations from propeller theory are indeed empirical and require the use of specific units for specific values of constants. Thus, units for a particular variable may change for different applications. However, we have agreed to specify units and dimensions through this section of the report and this confusion should be diminished.

Attachment 1:

Memorandum from Dr. Abdelrhman of 20 December 1996

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9
75 Hawthorne Street
San Francisco, CA 94105-3901

December 30, 1996

Steve L. Costa
Project Manager
CH2M Hill
P.O. Box 12681
Oakland, CA 94607-4046

Re: Review of CH2M Hill Responses to EPA's Comments on the Joint Cannery Ocean Dumping Studies in American Samoa, July 1996

Dear Steve:

Dr. Mohamed Abdelrhman of EPA's Narragansett research laboratory reviewed your responses to his comments on the ocean disposal study and his comments are attached. In general his responses are favorable, however, some disagreements still exist. I understand you have been working on revising the report and final issuance is awaiting our review and approval of your responses. As there are still some outstanding issues, I suggest you review Dr. Abdelrhman's comments, and if further discussion is needed, please contact me and I can arrange a conference call for us to discuss these issues.

I can be reached at 415/744-1594. As you know, the existing cannery ocean disposal permits have been extended until April to allow us to thoroughly review all the studies and data provided.

Sincerely,

Pat Young

Pat Young
American Samoa Program Manager

Enclosure

cc: Sheila Wiegman, ASEPA
Jim Cox, Van Camp Seafoods, Inc.
William D. Perez, VCS Samoa Packing Company
Norman Wei, StarKist Foods, Inc.
Barry Mills, StarKist Samoa, Inc.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL HEALTH AND ENVIRONMENTAL EFFECTS
RESEARCH LABORATORY
ATLANTIC ECOLOGY DIVISION
27 TARZWELL DRIVE • NARRAGANSETT, RI 02882

12/30/96

OFFICE OF
RESEARCH AND DEVELOPMENT

DATE: December 20, 1996

MEMORANDUM

SUBJECT: Technical Review of Modeling Report for EPA Region 9 - American Samoa Ocean Disposal Site for Fish Waste (comments on author's responses).

FROM: Mohamed A. Abdelrhman, Research Physical Scientist
Ecosystems Analysis and Simulation Branch, AED

Mohamed A. Abdelrhman

TO: Norman Lovelace, Chief
Office of Pacific Island Programs

Thank you for your kind response to my latest memorandum of October 30, 1996. Upon your request (your memorandum of November 19, 1996), my branch chief (Dr. Steve Schimmel) approved my continued participation in the technical assistance to Region 9.

I reviewed responses of Dr. Steve Costa, author of the report *"Joint Cannery Ocean Dumping Studies in American Samoa,"* to my technical comments (my memorandum dated September 3, 1996). In general the responses are favorable, however, some disagreements still exist. My acceptance, pending review of the revised report of the author's intended corrections (his memorandum of November 19, 1996) is indicated on the attachment by the word "accepted," unless otherwise indicated. I used the same system of titles and bullets used in the author's memorandum.

To me, and as I understand from Pat Young, time is a factor in this review process. To avoid any further delay, I hope that the concerns raised in this memorandum to be properly dealt with in the revised report. I also urge Region 9 to initiate a field study to provide validation data for this model. If you, Pat Young, Allan Ota, or Steve Costa have any questions or comments, please do not hesitate to call me at (401) 782 3182. I will be on annual leave December 22-29, 1996.

RECOMMENDATIONS:

(1) Region 9 should not accept this report until the requested revisions and/or explanations are provided by the contractor to EPA.

(2) Region 9 should support the conduct of a field study to validate the model results.

Again, if you have any comments or questions about my review, or if you request assistance in the development of a field study, please feel free to contact me.

ATTACHMENT: Comments on author's responses

Page 1 - Paragraph 1
Accepted.

Page 1 - Paragraph 2
[1] Partial acceptance

- Dumping dilution: state the equation for dumping dilution, and define all terms. A general reader of this report is not expected to put the time and effort I devoted to reproduce the results!
- Near field dilution: state the equations for A_o and Q_o and define terms (note: at x=0, Q_x=0)
- Accepted.

[2] State the values of I_1, I_2, and α.
[3] State the physical dimensions (units) at the first appearance of each parameter, coefficient, or constant and check the consistency of dimensionality of all equations.
[4] Accepted for "Dumping Dilution", but not accepted for "Nearfield Dilution" (see below).
[5] Accepted (I meant absolute error).
[6] Accepted, see [2] above.
[7] Refer to this memorandum for specific information to correct the existing errors in the report.
[8] Accepted.

Page 2 - Paragraph 1

- Accepted.
- Accepted.
- Accepted due to lack of field data. However, validation of model results is an essential part of any modeling exercise. A clear statement alerting the reader to the fact that all presented results are not yet validated is essential to avoid serious management decisions. I would urge Region 9 to initiate a field study to provide validation data for this model.
- Not accepted. Adequate number of graphs should be included in the report to illustrate method development (e.g., the three dilution zones) as well as results (e.g., as presented in Appendix B).
- Accepted.

Page 2 - Paragraph 2
[1] Equations for Dumping Dilution and Nearfield Dilution are already in the report. Include the equation for *Farfield Dilution* (from Appendix B, Equation 2.11) in the report to complete the picture.

- Accepted.
- Accepted.
- Accepted.

[2] Refer to comment above on adequate number of graphs.
[3] Accepted, see comment above on physical dimensions.
[4] Accepted, see comment above on physical dimensions.

Page 2 - Paragraph 3
Accepted.

Page 2 - Paragraph 4
[1] Accepted.
[2] Accepted.
[3] Accepted.

[4] Accepted.
[5] Accepted.
[6] Accepted.
[7] Not accepted. Refer to this entire memorandum to correct existing errors.
[8] Accepted, but order the information as: (1) illustration sketch of the two plumes, (2) Table of results, and (3) graph of clean parameter coefficient.

Page 2 - Paragraph 5

[1] No comments are presented on the three bullets. As I better understand the process, *Nearfield Dilution* has to be involved in this argument. The reason for the confusion between *Dumping Dilution* and *Nearfield Dilution* is the misplacement of the first paragraph in the *Nearfield Dilutions* section. This paragraph does not belong to this section, it belongs to the *Dumping Dilution* section, or maybe better to the *Revised Model Formulation and Prediction* section, or be eliminated. A graph (as requested above) of the three zones will clarify this issue. Note that the "hypothetical" velocity, V_A, of the ship was added to the whole setting to derive the equations. For *Dumping Dilution*, the author's argument is accepted that the discharged material will be spread over a volume, $\forall$, defined by $(1+b)V_A$ (i.e., the velocity relative to the vessel) and the propeller's area. But as soon as this is over, and at the onset of *Nearfield Dilution*, $\forall$ will travel at the real (not hypothetical) velocity relative to the ambient fluid, i.e., $(b\ V_A)$. The absolute velocity of $\forall$ can be identified using vector addition of $(b\ V_A)$ and the ambient current vector, but this is beyond the point. Actually, the vector difference between this jet-like velocity $(b\ V_A)$, and the assumed ambient currents (0.4 or 0.8 knots), is what causes entrainment of ambient fluid into the plume (jet mixing) in the nearfield. This entrainment produces the linear behavior of V_x with distance, x. The author should consult Figure 3.5 in Liu and Herbich (both the orifice and the ambient fluid are stationary), adding a hypothetical velocity to this system will not have any effect on the final result. Another way to view this is to consider an orifice moving (forward) at a velocity U while discharging (backward) at the same velocity in a quiescent ambient fluid. A parcel of water leaving the orifice at any time will have absolute velocity of ZERO, just like the ambient, and there will be no jet. In summary, The *Nearfield Dilution* values should be corrected by using the discharge velocity relative to the ambient fluid, not the vessel (i.e., $b\ V_A$).
[2] Aside from the rate of waste discharge, seasonality does not affect *Dumping Dilution* and *Nearfield Dilution*, but it affects *Farfield Dilution*. The reported *Dumping Dilutions* (Tables 4-1 and 4-2) are incorrect (see below).
[3] Accepted.
[4] Not accepted. Refer to [1].

Page 3 - Paragraph 1

Accepted.

Page 3 - Paragraph 2

[1] Include this justification in the report. The implemented approach is not conservative for reasons mentioned below. (e.g., assuming a 2.5 n mi to the edge of the dump site, instead of 1.5 n mi is not a conservative assumption).
[2] refer to [1].
[3] refer to [1].

Page 3 - Paragraph 3

Accepted.

Page 3 - Paragraph 4

- Accepted, see comment above on physical dimensions.
- Accepted.

- Accepted.
- Accepted.
- Accepted.

Editorial Comments on Marked Pages

- Accepted.
- Accepted.
- H is defined differently on pages 3-2 and 3-3. Present a consistent definition of H with illustration on the graph (sketch) of method development (as requested above). H should relate to the dimensions of the plume (or merged plumes) as indicated by the graph in the appendix for clean perimeter coefficient.
- Not accepted. The value of C_o is essential to define *Farfield Dilution* (see below). The exact value of this parameter has to be explicitly mentioned. Is C_o as defined by equation 2.1 in Appendix B, or by equation 3.1 in Appendix B, or set at an arbitrary value (i.e., 1000 mg/l) as used in Tables 4-1 and 4-2. The correct value of the initial concentration, C_o, should be the concentration value at the end of the nearfield dilution zone, i.e., at 1000 ft. Justification of the used value should be stated.
- Accepted.
- See comment above on physical dimensions.
- Not accepted. I will state my concerns for Tables 4.1 and 4.2:

  1. For the same ocean current (0.4 knots), vessel speed (6 knots), and loading rate (840 gpm) why is the *Dumping Dilution* for winter (796.2) is different than that for summer (931.6)? This error exists in all four dilution values for winter and their respective summer values.
  2. For the winter season: for the same vessel speed (e.g., 10 knots) why is the *Dumping Dilution* is the same (i.e., 731.4) for the two different loadings of 1200 gpm and 1400 gpm. The same question for winter with loadings of 720 gpm and 840 gpm. And the same for the summer season.
  3. *Nearfield Dilution* values should be corrected as mentioned above.
  4. Values in Table 4.1 should be calculated at 1.5 n mi not 2.5 n mi. The central zone of the dump site is the most conservative location for discharge, especially during windy conditions when current direction is not obvious to the barge captain.
  5. The text on page 3.8 indicate that *Nearfield Dilution* in Table 3.3 is for a single propeller as a function of "depth". "Depth" should be corrected to "distance". The results in the table indicate two propellers not a single propeller.

Additional Information

- Accepted.
- Accepted.
- Accepted, you mean K_o not K.
- The presented equations are empirical. The units used in the report are gpm (not cfs) for discharge, knots (not fps) for velocity. Refer to above comment on physical dimensions.

CC: Steve Schimmel, Acting Branch Chief, EAS, AED

Pat Young, American Samoa Program Manager, Region 9
Allan Ota, Ocean Dumping Program, Region 9
Janet Hashimoto, Region 9

Attachment 2:

Revised Tables 4.1 and 4.2

(Note: Additional Revisions will be Incorporated in Response to Comments)

Table 4.1

Predicted Dilution and Concentration at the Down Current Edge of the Ocean Dumping Zone

(at 2.5 Nautical Miles)

Season	Ocean Current (knots)	Vessel Speed (knots)	Loading (gpm)	Dumping Dilution Sd	Nearfield Dilution Sn	Farfield Dilution Sf	Total Dilution St	Final Concentration 1/(St)	Final Concentration (mg/l)
Winter	0.4	6	840	796.2	41.5	29.6	978,052	0.000001022	1.022
Winter	0.4	10	1400	731.4	41.5	17.9	543,320	0.000001841	1.841
Winter	0.8	6	840	796.2	41.5	27.6	911,967	0.000001097	1.097
Winter	0.8	10	1400	731.4	41.5	16.6	503,861	0.000001985	1.985
Summer	0.4	6	720	931.6	41.5	20.0	773,190	0.000001293	1.293
Summer	0.4	10	1200	855.7	41.5	12.1	429,709	0.000002327	2.327
Summer	0.8	6	720	931.6	41.5	18.6	719,067	0.000001391	1.391
Summer	0.8	10	1200	855.7	41.5	11.2	397,747	0.000002514	2.514

Note: St=Sd*Sn*Sf

Table 4.2

Predicted Dilution and Concentration near the Closest Reefline or Shoreline

(at 5 nautical miles)

Season	Ocean Current (knots)	Vessel Speed (knots)	Loading (gpm)	Dumping Dilution Sd	Nearfield Dilution Sn	Farfield Dilution Sf	Total Dilution St	Final Concentration 1/(St)	Final Concentration (mg/l)
Winter	0.4	6	840	796.2	41.5	76.6	2,531,040	0.000000395	0.395
Winter	0.4	10	1400	731.4	41.5	46.1	1,399,278	0.000000715	0.715
Winter	0.8	6	840	796.2	41.5	59.1	1,952,800	0.000000512	0.512
Winter	0.8	10	1400	731.4	41.5	35.5	1,077,535	0.000000928	0.928
Summer	0.4	6	720	931.6	41.5	51.5	1,990,964	0.000000502	0.502
Summer	0.4	10	1200	855.7	41.5	31.1	1,104,458	0.000000905	0.905
Summer	0.8	6	720	931.6	41.5	39.7	1,534,782	0.000000652	0.652
Summer	0.8	10	1200	855.7	41.5	23.9	848,764	0.000001178	1.178

Note: St=Sd*Sn*Sf

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL HEALTH AND ENVIRONMENTAL EFFECTS
RESEARCH LABORATORY
ATLANTIC ECOLOGY DIVISION
27 TARZWELL DRIVE • NARRAGANSETT, RI 02882

OFFICE OF
RESEARCH AND DEVELOPMENT

DATE: December 20, 1996

MEMORANDUM

SUBJECT: Technical Review of Modeling Report for EPA Region 9 - American Samoa Ocean Disposal Site for Fish Waste (comments on author's responses).

FROM: Mohamed A. Abdelrhman, Research Physical Scientist
Ecosystems Analysis and Simulation Branch, AED

Mohamed A. Abdelrhman

TO: Norman Lovelace, Chief
Office of Pacific Island Programs

Thank you for your kind response to my latest memorandum of October 30, 1996. Upon your request (your memorandum of November 19, 1996), my branch chief (Dr. Steve Schimmel) approved my continued participation in the technical assistance to Region 9.

I reviewed responses of Dr. Steve Costa, author of the report *"Joint Cannery Ocean Dumping Studies in American Samoa,"* to my technical comments (my memorandum dated September 3, 1996). In general the responses are favorable, however, some disagreements still exist. My acceptance, pending review of the revised report of the author's intended corrections (his memorandum of November 19, 1996) is indicated on the attachment by the word "accepted," unless otherwise indicated. I used the same system of titles and bullets used in the author's memorandum.

To me, and as I understand from Pat Young, time is a factor in this review process. To avoid any further delay, I hope that the concerns raised in this memorandum to be properly dealt with in the revised report. I also urge Region 9 to initiate a **field study** to provide validation data for this model. If you, Pat Young, Allan Ota, or Steve Costa have any questions or comments, please do not hesitate to call me at (401) 782 3182. I will be on annual leave December 22-29, 1996.

RECOMMENDATIONS:

(1) Region 9 should not accept this report until the requested revisions and/or explanations are provided by the contractor to EPA.

(2) Region 9 should support the conduct of a field study to validate the model results.

Again, if you have any comments or questions about my review, or if you request assistance in the development of a field study, please feel free to contact me.

ATTACHMENT: Comments on author's responses

Page 1 - Paragraph 1
Accepted.

Page 1 - Paragraph 2
[1] Partial acceptance

- Dumping dilution: state the equation for dumping dilution, and define all terms. A general reader of this report is not expected to put the time and effort I devoted to reproduce the results!
- Near field dilution: state the equations for A_o and Q_o and define terms (note: at x=0, Q_x=0)
- Accepted.

[2] State the values of I_1, I_2, and α.
[3] State the physical dimensions (units) at the first appearance of each parameter, coefficient, or constant and check the consistency of dimensionality of all equations.
[4] Accepted for "Dumping Dilution", but not accepted for "Nearfield Dilution" (see below).
[5] Accepted (I meant absolute error).
[6] Accepted, see [2] above.
[7] Refer to this memorandum for specific information to correct the existing errors in the report.
[8] Accepted.

Page 2 - Paragraph 1

- Accepted.
- Accepted.
- Accepted due to lack of field data. However, validation of model results is an essential part of any modeling exercise. A clear statement alerting the reader to the fact that all presented results are not yet validated is essential to avoid serious management decisions. I would urge Region 9 to initiate a field study to provide validation data for this model.
- Not accepted. Adequate number of graphs should be included in the report to illustrate method development (e.g., the three dilution zones) as well as results (e.g., as presented in Appendix B).
- Accepted.

Page 2 - Paragraph 2
[1] Equations for Dumping Dilution and Nearfield Dilution are already in the report. Include the equation for *Farfield Dilution* (from Appendix B, Equation 2.11) in the report to complete the picture.

- Accepted.
- Accepted.
- Accepted.

[2] Refer to comment above on adequate number of graphs.
[3] Accepted, see comment above on physical dimensions.
[4] Accepted, see comment above on physical dimensions.

Page 2 - Paragraph 3
Accepted.

Page 2 - Paragraph 4
[1] Accepted.
[2] Accepted.
[3] Accepted.

[4] Accepted.
[5] Accepted.
[6] Accepted.
[7] Not accepted. Refer to this entire memorandum to correct existing errors.
[8] Accepted, but order the information as: (1) illustration sketch of the two plumes, (2) Table of results, and (3) graph of clean parameter coefficient.

Page 2 - Paragraph 5

[1] No comments are presented on the three bullets. As I better understand the process, *Nearfield Dilution* has to be involved in this argument. The reason for the confusion between *Dumping Dilution* and *Nearfield Dilution* is the misplacement of the first paragraph in the *Nearfield Dilutions* section. This paragraph does not belong to this section, it belongs to the *Dumping Dilution* section, or maybe better to the *Revised Model Formulation and Prediction* section, or be eliminated. A graph (as requested above) of the three zones will clarify this issue. Note that the "hypothetical" velocity, V_A, of the ship was added to the whole setting to derive the equations. For *Dumping Dilution*, the author's argument is accepted that the discharged material will be spread over a volume, $\forall$, defined by $(1+b)V_A$ (i.e., the velocity relative to the vessel) and the propeller's area. But as soon as this is over, and at the onset of *Nearfield Dilution*, $\forall$ will travel at the real (not hypothetical) velocity relative to the ambient fluid, i.e., $(b\ V_A)$. The absolute velocity of $\forall$ can be identified using vector addition of $(b\ V_A)$ and the ambient current vector, but this is beyond the point. Actually, the vector difference between this jet-like velocity $(b\ V_A)$, and the assumed ambient currents (0.4 or 0.8 knots), is what causes entrainment of ambient fluid into the plume (jet mixing) in the nearfield. This entrainment produces the linear behavior of V_x with distance, x. The author should consult Figure 3.5 in Liu and Herbich (both the orifice and the ambient fluid are stationary), adding a hypothetical velocity to this system will not have any effect on the final result. Another way to view this is to consider an orifice moving (forward) at a velocity U while discharging (backward) at the same velocity in a quiescent ambient fluid. A parcel of water leaving the orifice at any time will have absolute velocity of ZERO, just like the ambient, and there will be no jet. In summary, The *Nearfield Dilution* values should be corrected by using the discharge velocity relative to the ambient fluid, not the vessel (i.e., $b\ V_A$).
[2] Aside from the rate of waste discharge, seasonality does not affect *Dumping Dilution* and *Nearfield Dilution*, but it affects *Farfield Dilution*. The reported *Dumping Dilutions* (Tables 4-1 and 4-2) are incorrect (see below).
[3] Accepted.
[4] Not accepted. Refer to [1].

Page 3 - Paragraph 1

Accepted.

Page 3 - Paragraph 2

[1] Include this justification in the report. The implemented approach is not conservative for reasons mentioned below. (e.g., assuming a 2.5 n mi to the edge of the dump site, instead of 1.5 n mi is not a conservative assumption).
[2] refer to [1].
[3] refer to [1].

Page 3 - Paragraph 3

Accepted.

Page 3 - Paragraph 4

- Accepted, see comment above on physical dimensions.
- Accepted.

- Accepted.
- Accepted.
- Accepted.

Editorial Comments on Marked Pages

- Accepted.
- Accepted.
- H is defined differently on pages 3-2 and 3-3. Present a consistent definition of H with illustration on the graph (sketch) of method development (as requested above). H should relate to the dimensions of the plume (or merged plumes) as indicated by the graph in the appendix for clean perimeter coefficient.
- Not accepted. The value of C_o is essential to define *Farfield Dilution* (see below). The exact value of this parameter has to be explicitly mentioned. Is C_o as defined by equation 2.1 in Appendix B, or by equation 3.1 in Appendix B, or set at an arbitrary value (i.e., 1000 mg/l) as used in Tables 4-1 and 4-2. The correct value of the initial concentration, C_o, should be the concentration value at the end of the nearfield dilution zone, i.e., at 1000 ft. Justification of the used value should be stated.
- Accepted.
- See comment above on physical dimensions.
- Not accepted. I will state my concerns for Tables 4.1 and 4.2:

  1. For the same ocean current (0.4 knots), vessel speed (6 knots), and loading rate (840 gpm) why is the *Dumping Dilution* for winter (796.2) is different than that for summer (931.6)? This error exists in all four dilution values for winter and their respective summer values.
  2. For the winter season: for the same vessel speed (e.g., 10 knots) why is the *Dumping Dilution* is the same (i.e., 731.4) for the two different loadings of 1200 gpm and 1400 gpm. The same question for winter with loadings of 720 gpm and 840 gpm. And the same for the summer season.
  3. *Nearfield Dilution* values should be corrected as mentioned above.
  4. Values in Table 4.1 should be calculated at 1.5 n mi not 2.5 n mi. The central zone of the dump site is the most conservative location for discharge, especially during windy conditions when current direction is not obvious to the barge captain.
  5. The text on page 3.8 indicate that *Nearfield Dilution* in Table 3.3 is for a single propeller as a function of "depth". "Depth" should be corrected to "distance". The results in the table indicate two propellers not a single propeller.

Additional Information

- Accepted.
- Accepted.
- Accepted, you mean K_o not K.
- The presented equations are empirical. The units used in the report are gpm (not cfs) for discharge, knots (not fps) for velocity. Refer to above comment on physical dimensions.

CC: Steve Schimmel, Acting Branch Chief, EAS, AED

Pat Young, American Samoa Program Manager, Region 9
Allan Ota, Ocean Dumping Program, Region 9
Janet Hashimoto, Region 9

MEMORANDUM

CH2MHILL

Response to Comments on Ocean Dumping Studies

TO: Pat Young/EPA Region 9

COPIES: Sheila Wiegman/ASEPA
Norman Wei/StarKist Foods
Jim Cox/Van Camp Seafood
Barry Mills/StarKist Samoa
Bill Perez/VCS Samoa Packing
Kyle Winslow/CH2M HILL

FROM: Steve Costa/CH2M HILL

DATE: 24 October 1996

This memo provides responses to comments received on the *Joint Cannery Ocean Dumping Studies in American Samoa* (CH2M HILL, June 1996). Comments were provided by Dr. Mohamed Abdelrhman from EPA's Narragansett laboratory and were received by CH2M HILL on 19 September 1996. The comments are attached to this memorandum. CH2M HILL will make appropriate changes and modifications to the report to address the comments. The changes we propose are indicated in the responses to specific comments discussed below. We will reissue a revised report after EPA reviews and approves the responses and proposed actions below. To avoid further delay, a revised report is being prepared while the responses below are being reviewed by EPA. We will issue the report as soon as possible after review of this memorandum.

Page 1 - Paragraph 1

Appendices 8 and 9 were inadvertently misplaced and cited incorrectly as pointed out. We apologize for the inconvenience and will rectify the condition.

Page 1 - Paragraph 2

[1] The reviewer states that the mathematical equations used in the models were incomplete and prevented independent reproduction of the results. In general we disagree with this comment for the following reasons:

- Dumping dilution: The reviewer was obviously able to generate results using this model. His results were somewhat different, and this point is discussed further below. Farfield dilution: All equations used for the farfield model calculations are provided.
- Nearfield dilution: All equations used for the farfield model calculations are provided. However, some constants were inadvertently omitted as discussed further below. These values will be provided.

- Farfield dilution: A full set of equations was presented in the attached copy of the previous FEIS Model Description. CH2M HILL staff were able to reproduce the results of this model (with the differences described in the report) from the information presented. We used exactly the same model for our farfield dilution calculations as described in the report. Therefore, we believe the nearfield model was adequately described and needs no further documentation.

Based on the above comments we would need more information from the reviewer as to respond in more detail to this comment.

[2] The reviewer states that values of parameters, coefficients, or constants used in the models were not provided for some equations and prevented independent reproduction of the results. We believe all of the definitions and values required are provided in the report (with the exception noted above). We respond to specific comments on this issue below. We require more detailed and specific information from the reviewer as to respond in more detail to this comment.

[3] The reviewer states that dimensions of parameters, coefficients, or constants used in the models were not provided for some equations and prevented independent reproduction of the results. We believe all of the dimensions required are provided in the report. We respond to specific comments on this issue below. Again, we require more detailed and specific information from the reviewer as to respond in more detail to this comment

[4] The reviewer states that the reported values for dumping dilution are overestimated (by 20 percent for the case referenced) because of an error in velocity calculations. We disagree with this comment, and provided a more detailed response below.

[5] The reviewer states that the error describe above (velocity calculations) would be magnified for two propellers and further when multiplied by nearfield and farfield dilutions. There will be no relative magnification even if the error actually exists. The error will remain at 20 percent since the referenced calculations are multiplicative. We believe that the reviewer is actually referring to the absolute differences in total dilution, not the percent error.

[6] The reviewer states that he was not able to reproduce nearfield dilutions. See response above.

[7] The reviewer states that the report must be completed and corrected and re-submitted for evaluation. CH2M HILL proposes to make changes, clarifications, and corrections as detailed in this memorandum. However, we need more specific information to address some of the comments concerning inadequate equations, parameter values, and dimensions to respond fully to the reviewer. However, we do believe that the changes proposed in this memorandum are sufficient.

[8] The reviewer also provided editorial comments marked on supplied copies of specific pages. These comments are addressed at the end of this memorandum.

Page 2 - Paragraph 1

This paragraph discusses deviations from the original study plan. As in any study of this kind, such deviations often arise. We believe that all such deviations are, at least implicitly, covered in the report. However, we will add a section to Chapter three of the report explicitly describing the deviations pointed out by the reviewer. This section will include:

- Sensitivity to lateral diffusion and vertical diffusion coefficients: For the reasons presented in the report we used the same coefficients as used in the FEIS study, and did not do a formal sensitivity analysis (although we did look at the sensitivity, we did not present a formal analysis).
- Effluent characteristics of density and settling speed: We did not utilize these parameters (except in our reproduction of the previous FEIS results). As described in the report we considered the entire plume as a surface plume which provides a worst case analysis.
- Validation of results: We do not have the field data to do such a validation and based on the FEIS no such validation appears necessary. Based on the final conclusions concerning toxicity, we feel such an effort is not needed.
- Graphical presentation of results: We believe that the tabular presentation is sufficient to describe the results. Based on the final conclusions concerning toxicity, we feel such an effort is not needed. However, we will add one or two graphical representations of the model results (something along the lines of dilution or concentration as a function of distance from the vessel).
- Effect of the effluent characteristics: see comment above on sensitivity.

Page 2 - Paragraph 2

[1] The reviewer indicates that the modeling presentation was unsystematic, and he had to go back and forth between the Appendices and the main text to complete the review. In general the report was intentionally written to provide a description in the main text of the overall modeling study that could be reasonably followed and understood by an interested person who does not have the technical background, or need, to understand all of the mathematical and physical details of the model. The main text is oriented so that such a person could follow the major concepts and results - it is our understanding that this is an appropriate format for presentation. We present the following responses to specific comments regarding this point:

- Details of the evaluation of the FEIS model are summarized in the text and additional details are provided in the Appendix. The mathematical and physical aspects of the model are completely described in the Appendices, and we will add a sentence alerting the reader that for a thorough description of the model the Appendix should be consulted. Our evaluation of the FEIS model, except for detailed output, is described in the text.
- The farfield model is completely described in the Appendix, and modifications are indicated in the text. We will add a sentence in the text alerting the reader

that for a thorough description of the model's mathematical and physical details, the Appendix should be read first and then the material in the text. We believe that a reader familiar with the Brook's formulation for dispersion of a plume should be able to follow development in the text without undue difficulty, with only minimal reference to the Appendix. All material needed to reproduce our results is included in the text and appendix. Additional references are provided as well.

- The dumping dilution and nearfield models are completely described in the text of Chapter three since this is a new aspect and replaces the initial dilution calculations of the FEIS model. References are provided for the reader who would like more detail. We agree that it may be difficult to reproduce the results without recourse to the references, and will include a copy of the primary reference in the Appendices - if this can be done without infringing on copyright laws.

The reviewer concludes that the CH2M HILL adaptation of the farfield model should be more completely described in the text, as a stand alone model. Based on the comments above, we believe sufficient information is already in the report, and feel that placing the mathematical derivation and formulations in the main body of the text would make the report less useful for the typical reader and target audience.

[2] The reviewer states that the report lacks graphical representations to illustrate the methods and results. Our initial thought was that anyone familiar with the mathematical and physical processes would not need figures. However, we agree that one or two summary figures would assist the less technical reader in understanding the major aspects of the model. We will add one or two simple line drawings in the main body of the text and more clearly reference sources of other, more detailed, explanations, as appropriate.

[3] The reviewer states that physical units were not mentioned for parameters, coefficients, and constants in all equations. A review of the report indicates that all such units are included, but may not be as clearly stated as might be desirable. We will review all equations for consistency and definition and add physical units as appropriate. However, for an equation, dimensional consistency is always expected and units need not be explicitly stated unless a particular numerical value is presented, or if a "constant" is not actually dimensionless. We will adhere to this convention. We will review all equations and variable, parameter, coefficient, and constant definitions and add or clarify units or dimensions as appropriate.

[4] The reviewer dislikes the use of different units within different sections of the report. There are two schools of thought on this topic. The reviewers view point that a consistent system of units "must" be used is one of these. However, we believe that units consistent with a particular application are more appropriate. For example knots is appropriate when discussing vessel speed, since that is the common and accepted usage, and cm/sec or m/sec may be more appropriate when discussing current meter data. Converting all units to a common system when dealing with a wide range of disciplines always adds one more way in which mistakes may be made. It is noted that the permit itself uses both various English and metric units. We will either add a conversion table or parenthetically indicate SI units throughout. But we do not feel it is necessary to convert all units to one system.

Page 2 - Paragraph 3

The reviewer correctly states that the term "conservative" is not explicitly defined. This was an oversight and we apologize. Conservative, when applied to assumptions or methodology, always indicates that the expected result is most likely to be an overstatement of concentration (of waste) or an understatement of dilution within the temporal and spatial context of the statement. We will ad a sentence at the beginning of Section 3 to clarify this point. We will also indicate the justification for our use of the term where appropriate. Often times such justification is based on experience and/or judgment and may be considered subjective - we will so state when this is the case.

Page 2 - Paragraph 4

[1] The justification of the definition of plume (half) width $b=0.096 \cdot x$ is based on experiments by Albertson as referenced by Sobey. We apologize for the inadvertent omission of references and will add these.

[2] Yes, "b" is the plume radius or half width (taken as a measure of the plume width for a single propeller). We will clarify as above.

[3] The use of x rather than x' in the farfield model is justified since it results in a conservative result as mentioned above and in the report. This will also be addressed in the deviations section to be added as described above. We agree with the reviewer that in the propeller slipstream $x \approx x'$ and will add this assumption. Even if not exact, the assumption is conservative.

[4] Neglecting vertical diffusion in the nearfield model is justified as in point [3] above since it results in a conservative result as mentioned above and in the report. This will also be addressed in the deviations section to be added as described above. In the propeller slipstream horizontal and vertical diffusivities are approximately equal (which is the basis of our approach and we will add this assumption). We did not ignore this effect as stated by the reviewer.

[5] The reviewer correctly states that the values of theta 2 are incorrect. It appears that a preliminary version of the output files were included in the report. To improve the presentation of this portion of the report we have reworked the calculation of the coefficient to clarify the approach and will replace the existing Appendix showing the calculation with the version attached to this memorandum. However, the results of the initial calculations as presented are correct - the newly calculated values are the same as the original for practical purposes.

[6] The reviewer states that the number of significant figures presented for the angles are not sufficient for accurate calculations. We note that the table is reproduced from an EXCEL spreadsheet and the numbers used in the actual calculations are internally carried out to a number of digits more than sufficient for accurate calculations. When, cleaning up the table for presentation we artificially limited the number of digits. We will expand the number of digits in these columns.

[7] Finally, the reviewer states that the result of the errors pointed out above will affect the results in calculation of clean entrainment coefficient and results of nearfield dilution. We contend that the "errors" are all demonstrably conservative as discussed above.

[8] As stated by the reviewer, the table and figures in the appendix are not labeled. Since there is no possible ambiguity resulting from a lack of numbers, and the graphics are clearly titled, we see no reason for numbering them.

Page 2 - Paragraph 5

[1] The reviewer indicates he believes there value of dumping dilution is incorrect since he considers that we used the velocity of the propeller slipstream relative to the ship to calculate the dilution, and we should have used the velocity of the slipstream relative to the ambient fluid. He states that the speed of the point source is irrelevant to the mixing and dilution because mixing depends on the value of jet velocity relative to the ambient fluid. He recalculates the dumping dilution at a value 20 percent less than presented in the report. We disagree with the reviewer, and believe he has misinterpreted the development presented. The following three points are relevant to this discussion:

- First, we disagree with the premise stated by the reviewer that the speed of a point source moving through the receiving water is irrelevant to the dilution of a discharge from such a source. Consider a ship stopped in quiescent water discharging at a certain rate and a ship moving through the water discharging at the same rate. The character of these two wastefields will be quite different. (Any effect of the propeller slip stream is ignored - the results will still be quite different in the size, shape, and concentrations of the wastefield.) However, this is not really the point here.

- Second, we are not considering, for this case, the mixing of ambient water into the slip stream as stated by the reviewer. We are considering the mixing of the discharge into the slipstream. The velocity of water through the propeller, V_0 [L/T], along with the disc area of the propeller, is used to calculate the flow, Q_0 [L^3/T], through the propeller. (The flow through the propeller depends on the speed the vessel is making through the water - thus we correctly use the velocities presented). Into this flow is injected the waste flow, Q_w [L^3/T]. The assumption is that Q_w is immediately and uniformly mixed throughout the slip stream. This is an extremely realistic assumption and one need only watch the extreme turbulence of flows through a propeller to understand this point. It is the two volume flows that define the dumping dilution: $\{(Q_0 + Q_w)/ Q_w\}$. And the relative speeds do not enter this calculation.

- Third, although we disagree, on what we believe are sound technical grounds, we will insert the reviewers opinion into the report if this issue cannot be resolved. A twenty percent reduction in dumping dilution will not change the ultimate conclusions or recommendations of this study.

Based on the above discussion, we do not think any modifications to this portion of the study or report are required, although we will clarify the process used along the lines of the above discussion in the report.

[2] The reviewer states that dumping dilution does not depend on winter or summer conditions. However, the Ocean Dumping Permits clearly place different limits on the rate of waste discharge on a seasonal basis. This changes Q_w in the above relation and obviously changes the dumping dilution, as we calculate it. This does raise an interesting point, however. The seasonal differences in the discharge rate are based on the previous analysis as described in the FEIS (as referenced in the report). One of our conclusions should be that a season difference in dumping rates is not supported by our analysis - we will add that to the report.

[3] Oops! Mea culpa! Red faced, embarrassment! The reviewer correctly points out that two entries in Table 4.1 and 4.2 are transposed (same mistake in Table 3.4) Revised tables are attached to this memorandum, showing the corrections. Note that the values are correct in the detailed output in Appendix 10 - Farfield Model Output. I apologize for any inconvenience.

[4] The reviewer asks why nearfield dilution values are constant for different loadings. We agree this is, at first, a counter intuitive result. This situation is a consequence of how we are defining the various dilutions - the value of interest is the product of the "dumping dilution" and the "nearfield dilution " which is analogous to the "initial dilution" described in the FEIS, and does vary with initial loadings of discharged waste. Nearfield (and farfield) dilutions are calculated as relative dilutions as described in the report. Thus, the nearfield dilution describes the mixing of the initial slipstream volume flows with ambient fluid. As indicated in the report the initial loading (flow at the plane of the propeller) and the flow in the slipstream both vary with vessel speed. As shown in the report, since flow in the slipstream at an arbitrary distance from the propeller depends on the initial flow, this leads to invariance in the parameter we have defined as nearfield dilution.

Page 3 - Paragraph 1

The reviewer correctly interprets the physical meaning of the "clean entrainment coefficient" but considers the terminology confusing. We believe the meaning of this parameter as defined is clear, and will add text to indicate that it should not be confused with the conventional "entrainment coefficient". We feel the terminology used is adequate and descriptive - one could consider it a correction to the conventionally defined parameter and thus the terminology used in the report is appropriate. We have, however, renamed the parameter as the "clean perimeter ratio" or CP ratio as shown in the attachment to this memorandum.

Page 3 - Paragraph 2

The reviewer questions an apparently arbitrary definition of the end of the nearfield at 1000 feet. This issue, as raised by the reviewer, has several points which are addressed below. We will add text, possible a new section, in the modeling description to discuss the transition between nearfield and farfield based on the specific responses below.

[1] The reviewer states that nearfield diffusion ends where passive diffusion is comparable to turbulent diffusion within the plume. He further indicates that this may not be at 1000 feet and a more justifiable distance should be used. Actually there are three regions to

consider (following the initial mixing that we refer to as dumping dilution): a region where turbulent diffusion dominates, a transition region where turbulent diffusion and passive diffusion are comparable, and a region where only passive diffusion is acting. The diffusion, and thus dilution, is greater in the turbulent region than in the passive region, and would be intermediate between these two in the transition region. We took an approach that considers the nearfield within a region that is dominated by turbulent diffusion in the jet. This region was "arbitrarily" taken as 1000 feet based on examination of the lapse rate of dilution (with distance) compared to the lapse rate of dilution as predicted by the farfield model. At this point we then ignored the region where turbulent and passive diffusion would be comparable and started the farfield dilution calculations. Since the transition region would exhibit greater diffusion than the farfield (passive) region, our approach will understate the dilution achieved. This is, we believe, consistent with the objectives of the study which are not necessarily to provide the most accurate or sophisticated prediction of dilution but rather to provide a prediction to evaluate the impacts of discharge at the edge of the permitted zone. If a very conservative approach shows no impact there is no rationale for refining the predictions.

[2] The reviewer goes on to state that there should be a smooth transition between the end of the nearfield to the beginning of the farfield. This would require a third model that handles both turbulent (turbulence originating from the propeller slip stream) and passive (ambient levels of turbulence) diffusion in the transition region where they are of comparable magnitude. This was not done, as indicated by the reviewer, for exactly the same reasons described in point [1] above.

[3] The review asks if the dimensions of the plume between the nearfield and farfield are matched and if the dimension at the beginning of the farfield is the same as previously used (based on the turning radius of the ship). There is a disconnect between the two regions, they are not rigorously matched. This would require the development of the transition zone described above. Again, this is justified by the same reasons above. Specifically, if we see no impact at the edge of the dumping zone using a conservative approach, there is no reason to refine the approach. The reviewer should consider the end use of the model predictions with respect to the toxicity described by the bioassay portion of the study. The value used for the initiation of the farfield plume was consistent with the turning radius of the ship for the reasons given in the FEIS and described below.

Page 3 - Paragraph 3

The reviewer raises the question of plume overlap, and based on the ambient current speed, vessel speed, and dumping track of the vessel, we find that the vessel operations are constrained by the permit such that overlap is not expected. The more important, but related, issue is one of plume formation by merging as the vessel turns at the end of each leg. We considered this question during the study and take the same approach as in the FEIS model. The potential for overlap would occur only at the ends of each leg. To account for this eventuality we used a length parameter based on the turning radius of the ship as the worst case just as was done in the FEIS model. We will add a discussion, or section, to the model description to describe this approach.

Page 3 - Paragraph 4

The reviewer states that the following concerns need to be dealt with in the report:

- "Physical units of all parameters, coefficients, and constants in the equations must be mentioned": We will revise as appropriate to the extent described above (dimensional consistency will be maintained within equations and units will be provided when there may be ambiguity). It would be useful to have a specific list of those parameters the reviewer has questions about.
- "Physical units must be consistent throughout the report": We disagree that this is either necessary or appropriate as described above. However, we will take the action described above.
- "Values of the constants I_1, I_2, and α (page 3.7) must be mentioned to allow reproduction of the calculated 'nearfield dilution' in Table 3.3 column 5": We apologize for this oversight and will provide those values. (The values were included in a draft of the Table but were inadvertently left off the final version.)
- "The value of Q_0 needs to be mentioned, is it the pipe discharge? Or the discharge after *dumping dilution*? If the latter is true, what is the area involved with V_0 to calculate Q_0. Is V_0 on page 3-7 the same as V_0 on page 3-6? Calculation of dumping dilution (e.g. 398.9:1) from velocity (V_0) needs to be stated explicitly in page 3-7.": The definitions of the variables are consistent within the report and, we thought, clear form the context of the discussions. We will clarify to address the reviewer's comments. The issue of the calculation of dumping dilution was addressed above and we will clarify as indicated above.
- "The equation for θ on page 3-2 is incorrect, it should read $\theta=\tan^{-1}(w_s/u)$": We will correct the typo.
- "x and x' (page 3-2) must be defined": They are defined but we will clarify.

Editorial Comments on Marked Pages

The reviewer provided editorial markups of several pages from the report. In terms of typographical errors and clarifications we will review and revise as appropriate. In most cases the comments have been covered in the comments above. Listed below are only those items that we will not modify as indicated:

- Page 3-1: We disagree that the introductory sentences to the Previous Model Formulation are provided too early in the text, however, we will revise for clarity in conjunction with additional text in the introductory section concerning the approach and rationale of the modeling study.
- Page 3-3: We will check the last sentence of the first full paragraph, but believe our statement is reasonable. We will expand and explain if appropriate.

- Page 3-3: H is a parameter defined by the equation. We do not think any additional description is required.
- Page 3-4: The mathematical definition of C_0 is beside the point here. However, we will clarify that it is based on a ratio.
- Page 3-6: We do not agree that our previous use of the model is irrelevant. This type of application is not common, and the fact that it has been applied previously for similar applications is, at least, of interest to someone making a regulatory decision.
- Page 3-6: It is not necessary to state any additional units on this page since the equations are all dimensionally consistent. The fact that the velocities must be in knots is specified.
- Page 4-2: All the points marked on this table have been discussed above. A set of revised Tables is attached to this memorandum.

Additional Information

The following additional information is presented here for clarification:

- Page 3-3: comments regarding numerical approximation to error function should reflect that our approximation is good to 10^{-7}
- Page 3-6: V_0 and V_A are both in knots, density is in slugs/ft^3, diameter in feet, A_0 in ft^2: an equation defining dumping dilution will be added
- Page 3-7: the equation for Q_x has a typo and should read $\alpha \cdot x \cdot I_1 \cdot (2 \cdot \pi \cdot K/I_2)^{1/2}$
- Page 3-7: the velocity V_0 should be consistent with Q_0 (i.e. in ft for cfs)

Attachment 1

EPA Review Comments

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

September 16, 1996

Steve L. Costa
Project Manager
CH2M Hill
P.O. Box 12681
Oakland, CA 94607-4046

Dear Steve:

The Joint Cannery Ocean Dumping Studies in American Samoa, July 1996, which evaluates the ocean disposal model for the canneries' fish processing wastes, was submitted to our research laboratory in Narragansett for review. Attached are the comments made by our reviewer, Dr. Mohamed Abdelrhman. One of his main criticisms is that there is not enough information contained in the report for him to adequately reproduce any of the stated results. Thus, the report should be revised and completed for his re-evaluation. We would appreciate the report being revised to adequately address his comments and all of his concerns within 30 days.

Please call me at 415/744-1594 if you have any questions or if you will not be able to respond to these comments within the requested timeframe. Thank you.

Sincerely,

Pat Young

Pat Young
American Samoa Program Manager

Enclosure

cc: Sheila Wiegman, ASEPA
Jim Cox, Van Camp Seafoods, Inc.
William D. Perez, VCS Samoa Packing Company
Norman Wei, StarKist Foods, Inc.
Barry Mills, StarKist Samoa, Inc.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL HEALTH AND ENVIRONMENTAL EFFECTS
RESEARCH LABORATORY
ATLANTIC ECOLOGY DIVISION
27 TARZWELL DRIVE • NARRAGANSETT, RI 02882

Rcd 9/12/96

OFFICE OF
RESEARCH AND DEVELOPMENT

DATE: September 3, 1996

MEMORANDUM

SUBJECT: Technical Review of Modeling Report for EPA Region 9 - American Samoa Ocean Disposal Site for Fish Waste

FROM: Mohamed A. Abdelrhman, Research Physical Scientist
Ecosystems Analysis and Simulation Branch, AED

Mohamed A. Abdelrhman

THROUGH: Steve Schimmel, Acting Branch Chief, EAS, AED

TO: Norman Lovelace, Chief
Office of Pacific Island Programs

This technical review of the report *"Joint Cannery Ocean Dumping Studies in American Samoa"* is limited to the modeling aspects of the report namely:
Chapter 1: Introduction
Chapter 3: Model Evaluation
Chapter 4: Conclusions and Recommendations
Appendix 2: Study Plan
Appendix 8: Calculation of Entrainment Adjustment
Appendix 9: FEIS Model Description
Appendix 10: Farfield Model Output
Note: The material in Appendixes 8 and 9 are misplaced in the report, and the two appendixes are cited wrongly in the report (e.g., pages 3-1 and 3-8) .

The report describes results of bioassay testing and modeling of fish processing wastes. Overall, the approach used is based on mathematical modeling, which implements a set of mathematical equations to solve for unknown values. The information presented in the report is not adequate to reproduce any of the stated results due to one or more of the following: (1) incomplete set of mathematical equations, (2) lack of values for parameters , coefficients, or constants in some equations, and (3) unknown physical dimensions (units) of parameters , coefficients, or constants in some equations. I was able to reproduce *dumping dilution*, however, the reported values are overestimated (e.g., by 20% for discharge flow of 1400 gpm using one propeller) due to an error in velocity calculations (see below). This error will be magnified for two propellers and will be magnified further when multiplied by *nearfield* and *farfield dilutions*. I was not able to reproduce the stated dilution values for *nearfield dilution* from the givings in the report. Accordingly, the report must be completed and corrected then resubmitted for re-evaluation. The following comments point at areas which need improvement in the report. Other editorial comments are marked on the attached copied pages from the report.

Some of the issues mentioned in the Study Plan (Appendix 2) were not covered in the report namely: (1) sensitivity analysis of model results to model parameters (e.g., lateral diffusion coefficient, A, vertical diffusion parameter, K_v), and effluent characteristics (density and settling speed); (2) validation of results so that predictions reflect reality; and (3) graphical representation of model results (contour plots, graphs, etc.). Examination of the effect of effluent characteristics was totally missing from the report.

A major inconvenience experienced while reading the report was the unsystematic presentation of modeling procedure and formulation in the main body of the report. The reader has to go back and forth between the main text and Appendix 9 for evaluation of the reproduced farfield model in Chapter 3, the farfield model formulation in Appendix 9, and the immediate and nearfield formulation in the main text in Chapter 3. The current model (CH2MHILL model) should be presented as a complete (stand-alone) model. Another inconvenience was that the report lacks graphical representations to illustrate the developed methods, formulation, important parameters, and results. Also, physical units were not mentioned for parameters, coefficients, and constants in all equations. Moreover, inconsistent units were used in different sections of the report and appendixes (e.g., m, ft; ft^3/sec, gpm; ft/sec, cm/s, knot; cm2/s). These inconveniences must be eliminated from the report.

In more than ten places (marked by !) in the report "conservative" or "conservatism" was used to indicate that the modeled dilution would be under estimated. However, no scientific justification was presented for this judgement, or where? and when? this judgement is true. My calculations (see below) indicate that the reported values were over-estimated by at least 20%. Unless proper justification is presented for the claimed conservatism it can not be accepted.

The calculation for entrainment (Appendix 8, see note above) are questionable. Plume width, b, is defined as b=0.096 x. First, this linear relationship is not mentioned or justified in any part of the report. Second, values in the theta1-column indicate the use of b as half plume width (not the whole width). Third, the effect of settling speed is ignored by the use of x instead of x', and the effect of vertical diffusion is also ignored, although these simplifications may be valid where the momentum jet from the propellers is dominant, they need to be stated. Forth, based on the presented figure, values in the theta2-column are totally wrong. Theta2 should be decreasing (not increasing) as x and b increase. Finally, the number of significant decimal digits for theta1 and theta2 are unacceptable for accurate calculations. These errors will affect values in the last two columns in the table presented in the appendix (table number and caption are missing) and the graph for Clean Entrainment vs Distance. These errors will also affect values in the last two columns (Entrainment Coefficient and Adjusted Dilution) in Table 3.3 for nearfield dilution.

The *dumping dilution* is based on the value of V_o. The presented formulation ship [$V_o = (1+b)V_A$] indicates that the value of V_o is relative to the ship which moves at the speed V_A. However, speed of the point-source (the ship) is irrelevant to jet mixing and dilution because mixing depends on the value of jet velocity relative to the ambient fluid. Hence, the velocity of propeller flow should be relative to the ambient fluid, i.e., $V_o = bV_A$. Based on the presented relationships, units, and vessel characteristics (page 3-6) for the case of discharge rate of 1400 gpm and vessel speed 10 knots, I calculated the dilution for a single propeller as 331.17:1, which is over estimated by ~20% by the value given in the report (398.9:1). Thus, reported *dumping dilution* values must be revised as well as the relevant values reported in the last three columns in Tables 4.1 and 4.2. Other values in these two tables must also be revised as indicated on the attached copied pages from the report. *Dumping dilution* does not depend on summer or winter, why are values different for the same loading, vessel speed, and ocean currents in Table 4.1 or Table 4.2?! If the edge of the dumping zone is at 2.5 n mi and the distance to the closest reefline or shoreline is 5 n mi, how can *farfield dilution* for the latter be less than that for the former for the same conditions?! Why are *nearfield dilution* values constant for different loadings (i.e.,

different V_oD_o) in Table 4.1 or Table 4.2 ?!

What is referred to as "entrainment coefficient" or "clean entrainment coefficient" in the report represents change in plume surface area due to the encounter of water surface or the merging of two plumes. This is not the theoretically known entrainment coefficient which relates the rate of entrained mass of ambient fluid (entrainment velocity * plume surface area) into the plume to the rate of mass flowing within the plume (plume velocity * cross-section area). The coefficient is better be given a different name to avoid misconception and to reflect its true physical meaning.

The justification presented in the report for using dilution at 1000 feet as representative for "nearfield dilution" is weak. The nearfield ends where passive diffusion (of ambient fluid) is comparable to turbulent diffusion within the plume. This may happen before or after the assumed 1000 feet. A more justifiable distance should be used to define nearfield dilution. Also, the plume should have a smooth transition between the end of the nearfield to the beginning of the farfield with respect to: dimension, mass conservation, and momentum conservation. These issues were not tackled in the report. For example, does the plume width at the chosen 1000 ft distance match the previously used dimension (twice the turning radius of the ship, 370.5 m) at the beginning of the farfield? If not, what value is used for the farfield?

It is mentioned in the report that the vessel will circle in the dump site as it discharges the waste. Meanwhile plume calculations were carried to 4-5 n. mi. Would there be any overlap of the plume with itself during the discharge? What effect would this overlap have on dilution calculations?

The following concerns need to be dealt with in the report:

- Physical units of all parameters, coefficients, and constants in the equations must be mentioned
- Physical units must be consistent throughout the report
- Values of the constants I_1, I_2, and α (page 3-7) must be mentioned to allow reproduction of the calculated "nearfield dilution" in Table 3.3 column 5.
- The value of Q_o needs to be mentioned, is it the pipe discharge? Or the discharge after *dumping dilution*? If the latter is true, what is the area involved with V_o to calculate Q_o. Is V_o on page 3-7 the same as V_o on page 3-6? Calculation of dumping dilution (e.g., 398.9:1) from velocity (V_o) needs to be stated explicitly in page 3-7.
- The equation for θ on page 3-2 is incorrect, it should read $\theta=\tan^{-1}(w_s/u)$
- x and x' (page 3-2) must be defined.

CC: Norm Rubinstein, Acting Director, AED
Brian Melzian, Program Operations, AED
Edward E. Dettmann, Research Environmental Scientist, AED
Allan Ota, Ocean Dumping Program, Region 9
Janet Hashimoto, Region 9

3. Model Evaluation

This section describes the re-evaluation of the previous model predictions of dispersion of the plume created by dumping fish processing wastes at sea. The previous predictions are presented in Appendix B of the FEIS (EPA, 1989) and in a supplementary study (SOS, 1990). Appendix B of the FEIS is reproduced in Appendix 8 of this report for convenience. The model re-evaluation was conducted in three phases as describe below. The three steps were:

- The existing model formulation, as described in the 1989 FEIS were used as described. The previous model was implemented as an Excel 5.0 spreadsheet and the results of the new formulation checked against the previous results. The model predictions are then used by applying the new bioassay test results presented in the previous section and this evaluation is provided in the conclusions and recommendations section of the report below.

- The input data and assumptions used in the model were examined and evaluated. Sensitivity studies were done for critical parameters, including assumed values for diffusion coefficients, initial dilution, and ambient conditions. The appropriateness and applicability of previously assumed values are discussed.

- A somewhat different approach, for the initial dilution as the waste is pumped into the propeller slipstream was developed. The objective of the new approach for initial dilution with a different model is intended to account for changes in vessel characteristics and operational methods and to develop more representative overall model predictions.

A summary of the model evaluation was provided to USEPA and ASEPA in a memorandum prepared by CH2M HILL (1995c). The descriptions below expand and further document the summary previously provided.

Previous Model Formulation

The previous model (FEIS model), based on an approach originally developed by Brooks (1960), is typically very conservative in similar applications. Other assumptions in the model are also conservative. The results of the model are presented in terms of dilution (or concentration) of fish processing waste versus distance from the initial dump site. Based on the results of the bioassay tests, the distance from the dump site where the effluent is diluted to the limiting permissible concentration (LPC) level can be determined.

The FEIS model formulation, based on the approach presented by Brooks (1960), is essentially the same basic model as CDIFF (Yearsley, 1989). The formulation developed by Brooks calculates the lateral diffusion of a discharge plume as it is advected in the longitudinal direction and does not account for longitudinal dispersion. As initially developed by Brooks, the approach does not account for vertical diffusion, does not provide for the settlement of negatively buoyant constituents in the plume, and does not account for the dispersion

volved in the basic formulation of the model involving the fundamental physics and mathematics used; [2] the assumptions and methodology used to chose the magnitudes of the variables describing the important physical processes; and [3] the values used for the description of ambient conditions and characteristics of the waste material. Each of these categories of model assumptions and input was examined and re-evaluated, as discussed in more detail below. In addition to the direct re-evaluation of the model assumptions and inputs, the sensitivity of the model to important variables was assessed.

The FEIS model is based on differential equations that consider lateral and vertical diffusion. Longitudinal diffusion (in the direction of the ambient current is neglected because of it's relative magnitude which is small compared to other terms. This assumption is well founded for the current patterns observed and anticipated in the disposal area. The actual equations were developed by Brooks (1960) and can be rearranged to resemble the classical error function by adding an exponential decay term. For open ocean applications the diffusivity is expressed in terms of a 4/3 power relationship, which is a widely accepted approach (see for example Fischer et al. (1979). The affect of vertical diffusion is assumed to be Fickian, an appropriate term is multiplied with the error function to predict total diffusion from both lateral and vertical components. The approach taken in the FEIS model appears reasonable for application to the farfield following the initial development of the waste plume. It is considered a conservative (underprediction of dilution) approach. It is noted that the model, as reproduced by CH2M HILL on a spreadsheet application uses a numerical approximation to the error function (with an associated error of less than $2 \cdot 10^{-7}$). Differences between the FEIS model and the CH2M HILL implementation of that model described above may be explained, at least in part, by differences in the approximations used for the error function. The presented numbers (10^{-5}) do not support this statement (10^{-7})!

The vertical diffusion in the FEIS model is dependent on a coefficient of vertical diffusion which is assumed constant during the winter and depth dependent during the summer (as reflected in the results in Tables 3.1a and 3.2). The reasoning behind this approach is based on the seasonal existence of a thermocline in the summer. The vertical diffusion coefficient is the only depth varying parameter in the governing equations used in the FEIS model. Based on this formulation, all calculations within a certain range of depths should result in constant dilution depending on the value of the coefficient. However, this is not the case with the FEIS model predictions, and missing sentence

In the FEIS model the initial plume depth is taken to be H/4, where the dimension H is obtained from the equation,

$$U \cdot L \cdot H \cdot C_0 = Q$$

where, H = ?

U = ambient velocity,

L = a characteristic length parameter,

C_0 = the initial waste concentration (at the beginning of farfield dilution),

and

Q = the flow rate of the waste stream from the barge.

The width of the initial plume is taken to be twice the turning radius of the dumping vessel. A characteristic length of the vessel, set equal to the geometric mean of the half beam, and the draft of the vessel, is the length parameter used in the equation to calculate initial concentration. The FEIS modeling report does not clearly justify this assumption. One of the suggested modi-

the conservative nature of the model to begin with, and do not compromise the results of the original study in any way. Overall agreement remains very good.

Another possible problem with the implementation of the FEIS model occurs when the two waste pumping rates are considered. The modeling report indicates that the discharge rate from the vessel is 140 gpm per knot of vessel speed, up to 10 knots. Initial concentration of waste is a function of flow divided by relative velocity. This implies that the initial concentration will remain about the same, particularly since the vessel speed is taken as the relative velocity as discussed above. However, the initial concentrations reported are 0.000222 and 0.000621, for a discharge of 500 gpm and 1400 gpm, respectively. It appears that the vessel speed was not varied with discharge rate. Again, this leads to overly conservative predictions, as the initial concentration for the higher discharge rate is over-stated.

The FEIS model was developed based on a different vessel, using a different operational mode of discharge, than currently used. CH2M HILL has considered the current vessel and operational procedures. Based on our evaluation of the existing model, including the possible errors mentioned above and the changes in discharge operation, we believe a revised model for the initial dilution process (prediction of initial concentration) is appropriate. The revisions should account for both the discharge of the material directly between the two counter rotating propellers of the FV *Tasman Sea* and a more sophisticated approach to dilution in the propeller slip stream. Subsequent dilution can then be calculated following methods similar to those used previously, and using CH2M HILL's spreadsheet formulation of the initial FEIS farfield model.

Revised Model Formulation and Predictions

An independent model was developed and used to evaluate the dispersion of waste discharged from the barge. The purpose of this model is to provide an alternative to more realistically describe the fate and transport of the discharge. The primary differences between the FEIS and the CH2M HILL model approaches are the use of initial dilutions as determined based on the dynamics of the propeller slipstream and the use of characteristics of the current dumping vessel.

The new model developed by CH2M HILL consists of three parts:

- Dumping dilution - results from the initial discharge into the propeller wash and is numerically equivalent to the propeller discharge rate plus the waste discharge rate divided by the waste discharge rate
- Nearfield Dilution - results from the entrainment of sea water into the momentum jet from the propellers which contains the waste discharge
- Farfield Dilution - results from the subsequent dilution of the plume and is essentially the same model used previously.

The formulation and predictions for each of the three parts of the model are described below.

There term K_T is the thrust coefficient which is a function of the propeller-characteristic curve and is approximated as a function of the speed coefficient, J_T, as described in Liou and Herbich for a typical case as:

what is this?

$$K_T = 0.48 - 0.41 \cdot J_T$$

and

$$J_T = 101.33 \cdot V_A / (n \cdot D)$$

where variables are as defined above, and n is the propeller rpm.

How were these values calculated from V_0? i.e., $A_0 V_0 / Q_{pipe}$

Application of the above relationships, using the vessel characteristics provided, results in the following immediate of dumping dilutions: 398.9:1 and 365.7:1 for discharge flows of 1400 gpm and 840 gpm, respectively, and for a single propeller stream. For the dual propellers the dumping dilutions become 796.2:1 and 731.4 for the same flows. The vessel is assumed to be traveling at 10 knots and at 6 knots for discharge rates of 1400 gpm and 840 gpm, respectively. This is the reasonable range of speeds the vessel can make in the open sea. These flows correspond to winter (June 1 through November 30) time permitted disposal rates of 140 gpm/knot with a maximum of 10 knots. The summer permitted limit is at 120 gpm/knot with a maximum of 10 knots and the dilutions would be approximately 1.17 times those listed above.

Nearfield Dilutions

The use of propeller theory to determine the immediate initial dilution replaces the initial dilution (or concentration, C_0) used in the FEIS model. As described above, CH2M HILL also applied another model between the initial dilution and the farfield method based on the Brooks method. This was done to account for the rapid mixing within the propeller slip-stream. The model assumes that all of the waste discharged is entrained in the slipstream. This is considered a very good assumption, and, based on the disposal method, it is difficult to see how the situation could be otherwise.

Reference !

The nearfield approach used considers conservation of momentum in a round momentum jet (the propeller slip stream). The centerline velocity, U_{CL}, and flow at any distance x from the point of discharge, Q_x, are given by:

$$U_{CL} = (1/\alpha \cdot x) \cdot [K_0/(2\pi \cdot I_2)]^{1/2}$$

and

$$Q_x = \alpha \cdot x \cdot I_1 \cdot [K_0/(2\pi \cdot I_2)]^{-1/2}$$

} units

where

$K_0 = Q_0 \cdot V_0$ with subscript $_0$ indicating initial conditions
I_1, I_2, and α = constants

nearfield dilution at a distance x from the point of discharge is given by Q_x/Q_0. The dilution as a function of x will remain the same for various vessel speeds, since the initial flow through the propeller changes in direct response to vessel speed. The momentum theory for propellers also provides a means to calculate velocity and is given in Liou and Herbich as referenced above:

$$V(r,x) = (V_0 \cdot D_0 / x) \cdot 10^{\varepsilon}$$

where

for A indicate that the value used is reasonable for open ocean applications. Fischer (1979) recommends using a value between 0.0002 and 0.001; Yearsley (1989) recommends the same range; Grace (1978) recommends 0.00015 to 0.005; and Baumgartner et al.(1993) recommend 0.0002 to 0.001. These suggested ranges are generally for application to nearshore coastal and inland waters. For open ocean water, with no effects of boundaries and significant wind and wave action, the high end of the suggested range is appropriate. Thus, the value previously used in the FEIS model (0.001) has been retained. Note that units of A as discussed above are $ft^{2/3}/sec$.

As in the case of the previous modeling, the farfield dilution is seasonally dependent based on the strength and structure of the thermocline. Farfield predictions were done for the same set of conditions as done previously:

- A range of ambient ocean current speeds of 0.2 to 1.0 knots
- A range of vessel speeds of 6 and 10 knots
- Winter conditions with no change in K_v with depth
- Summer conditions with K_v dependent on depth (only the surface layer was modeled for this case because that is a worst case condition)

The results of the farfield modeling are summarized in Table 3.4 and detailed model output is provided in Appendix 10. Table 3.4 reports the farfield dilution at distances of 2.5 and 5 nautical miles from the release area corresponding to the approximate downcurrent edge of permitted dump zone and the closest point to possible land influence. (These distances are somewhat less than actual distances to the points referenced.) Ocean currents of 0.4 knots and 0.8 knots, corresponding to minimum and maximum expected ocean currents (as discussed in the FEIS) are described for vessel speeds of 6 and 10 knots. Additional cases are provided in Appendix 10.

Summary of Model Predictions

The dilutions for the range of seasonal and operational parameters are as follows:

- Dumping dilution: The immediate dilution on dumping ranges from approximately 730:1 to 930:1 depending on discharge rate (seasonal constraint) and vessel speed, assuming a maximum permitted discharge per knot of vessel speed.
- Nearfield dilution: The dilution within the propeller slipstream, for first 1000 feet, is predicted to be about 42:1.
- Farfield Dilution: Using essentially the same model as applied in the FEIS the farfield dilution is predicted to range from approximately 11:1 to 30:1 prior to reaching the edge of the dumping zone, and 24:1 to 77:1 prior to reaching the shore line or closest reef area. The farfield dilution depends on a number of environmental and operational variables and can vary from season to season and from day to day.

Table 3.1
Comparison of Original FEIS and CH2M HILL Reformulated Model Predicitions

Distance (n. mi.)	Winter Conditions			Summer Conditions		
	CH2MHILL Model	FEIS Model	Percent error	CH2M HILL Model	FEIS Model	Percent error
Cmax/Co for Current Speed of 0.2 knots and Discharge of 500gpm						
0.0	1.00000			1.00000		
0.5	0.06745			0.10016		
1.0	0.03365	0.03364	-0.03	0.05001	0.04999	-0.04
1.5	0.02044	0.02043	-0.04	0.03039	0.03038	-0.05
2.0	0.01380	0.01379	-0.07	0.02053	0.02052	-0.05
2.5	0.00997	0.00996	-0.07	0.01483	0.01482	-0.07
3.0	0.00754	0.00754	-0.06	0.01123	0.01122	-0.07
3.5	0.00591	0.00591	-0.06	0.00880	0.00880	-0.02
4.0	0.00476	0.00476	-0.04	0.00709	0.00709	0.03
Cmax/Co for Current Speed of 0.2 knots and Discharge of 1400gpm						
0.0	1.00000			1.00000		
0.5	0.06745			0.10016		
1.0	0.03365	0.03364	-0.03	0.05001	0.05000	-0.02
1.5	0.02044	0.02043	-0.04	0.03039	0.03039	-0.01
2.0	0.01380	0.01380	0.00	0.02053	0.02052	-0.05
2.5	0.00997	0.00996	-0.07	0.01483	0.01483	-0.01
3.0	0.00754	0.00754	-0.06	0.01123	0.01123	0.02
3.5	0.00591	0.00591	-0.06	0.00880	0.00880	-0.02
4.0	0.00476	0.00476	-0.04	0.00709	0.00709	0.03
Cmax/Co for Current Speed of 0.4 knots and Discharge of 500gpm						
0.0	1.00000			1.00000		
0.5	0.05648			0.08393		
1.0	0.03386	0.03385	-0.02	0.05037	0.05035	-0.04
1.5	0.02305	0.02305	-0.02	0.03431	0.03430	-0.03
2.0	0.01685	0.01684	-0.04	0.02508	0.02507	-0.03
2.5	0.01291	0.01290	-0.04	0.01921	0.01920	-0.06
3.0	0.01023	0.01022	-0.08	0.01523	0.01522	-0.04
3.5	0.00832	0.00831	-0.10	0.01238	0.01238	-0.03
4.0	0.00690	0.00690	-0.06	0.01028	0.01028	0.00
Cmax/Co for Current Speed of 0.4 knots and Discharge of 1400gpm						
0.0	1.00000			1.00000		
0.5	0.05648			0.08393		
1.0	0.03386	0.03385	-0.02	0.05037	0.05036	-0.02
1.5	0.02305	0.02305	-0.02	0.03431	0.03430	-0.03
2.0	0.01685	0.01684	-0.04	0.02508	0.02507	-0.03
2.5	0.01291	0.01290	-0.04	0.01921	0.01921	-0.01
3.0	0.01023	0.01022	-0.08	0.01523	0.01522	-0.04
3.5	0.00832	0.00832	0.02	0.01238	0.01238	-0.03
4.0	0.00690	0.00690	-0.06	0.01028	0.01028	0.00
Cmax/Co for Current Speed of 0.8 knots and Discharge of 500gpm						
0.0	1.00000			1.00000		
0.5	0.04161			0.06190		
1.0	0.02828	0.02827	-0.02	0.04209	0.04207	-0.04
1.5	0.02139	0.02138	-0.04	0.03184	0.03183	-0.04
2.0	0.01694	0.01693	-0.06	0.02522	0.02521	-0.05
2.5	0.01382	0.01382	-0.02	0.02058	0.02058	-0.01
3.0	0.01153	0.01153	-0.02	0.01717	0.01717	-0.01
3.5	0.00979	0.00979	0.01	0.01458	0.01457	-0.04
4.0	0.00843	0.00842	-0.08	0.01255	0.01254	-0.06
Cmax/Co for Current Speed of 0.8 knots and Discharge of 1400gpm						
0.0	1.00000			1.00000		
0.5	0.04161			0.06190		
1.0	0.02828	0.02827	-0.02	0.04209	0.04209	0.01
1.5	0.02139	0.02138	-0.04	0.03184	0.03184	-0.01
2.0	0.01694	0.01694	0.00	0.02522	0.02522	-0.01
2.5	0.01382	0.01382	-0.02	0.02058	0.02058	-0.01
3.0	0.01153	0.01153	-0.02	0.01717	0.01717	-0.01
3.5	0.00979	0.00979	0.01	0.01458	0.01457	-0.04
4.0	0.00843	0.00842	-0.08	0.01255	0.01254	-0.06

Table 3.3
Nearfield Dilution Calculations

Distance (feet)	Centerline Plume Velocity (ft/sec)		Flow (ft^3/sec)	Dilution	Entrainment Coefficient	Adjusted Dilution
	Momentum	Propeller				
25	53.49	53.74	1394	2.04	1.00	2.04
100	13.37	13.43	5576	8.15	0.79	6.44
200	6.69	6.72	11151	16.29	0.58	9.45
300	4.46	4.48	16727	24.44	0.55	13.44
400	3.34	3.36	22302	32.58	0.53	17.27
500	2.67	2.69	27878	40.73	0.53	21.59
600	2.23	2.24	33453	48.88	0.52	25.42
700	1.91	1.92	39029	57.02	0.52	29.65
800	1.67	1.68	44604	65.17	0.52	33.89
900	1.49	1.49	50180	73.31	0.51	37.39
1000	1.34	1.34	55755	81.46	0.51	41.54

How are these calculated? I_1, I_2, α, Q_0 values?

4. Conclusions and Recommendations

This section presents the overall conclusions drawn from the model predictions, the model limitations, and recommendations based on the results of the study.

Conclusions

Table 4.1 shows the prediction of total dilution and final concentration prior to the point where the plume reaches the edge of the dumping zone (taken as 2.5 nautical miles down current). In the table, C/C_0 is the ratio of final to initial concentration and can be applied to calculate the concentration of any known constituent in the waste. The final concentration is also given in terms of an approximate value for the whole waste in mg/l, assuming the waste is about the density of water. At the edge of the dump zone the dilution of the waste is about 0.00025 percent of a sample in the center of the plume. Reference to Table 3.1 shows that the lowest LC50 of all bioassays conducted was 0.12 percent. Therefore, the concentration at the edge of the permitted dumping zone is 0.0021·LC50.

Table 4.2 shows the same information described above for the plume prior to reaching the shoreline (taken as 5 nautical miles down current). The model was formulated and implemented in a conservative fashion and the dilutions are expected to be underpredicted (concentrations over predicted).

Limitations

Most numerical models of the type used here contain coefficients (e.g. friction factors, diffusion coefficients) that are often study site specific. Although there are generally accepted values for these coefficients, the range observed in nature is high and the models can be somewhat sensitive to the values selected. The process of calibration and verification generally uses measured values of forcing functions and responses to determine the appropriate coefficients for the model configuration at the study site. Typically a set of field data is used to determine the correct values to use for the coefficients. However, this was beyond the scope of the present study and there is little or no available and appropriate data for this task. In this case the model sensitivity determination, the use and justification of reasonable values from the literature and similar studies, and the incorporation of a prudent level of conservatism is required and was accomplished.

Recommendations

CH2M HILL project staff, on the basis of the results of the study, have no recommendations for additional studies of this type.

Appendix 9
FEIS Model Description (Appendix B of 1989 FEIS)

Calculation scheme for clean entrainment coefficient

Assumptions and Basis for Calculations
plume center horizontal separation = 15 feet
plume width b = 0.096*x
x ranges from 25 to 1000 feet
plumes merge at x = 78.125 feet
at 78.125 feet clean entrainment coefficient = 1.0
plume encounters surface at x = 130 feet

check ?!

x (feet)	b (feet)	y (feet)	theta1 (rad)	theta2 (rad)	inside perimeter (feet)	clean entrainment coefficient
0	0.0					1.00
25	2.4					1.00
50	4.8					1.00
78.125	7.5	0.0	0.0		0.0	1.00
80	7.7	1.7	0.2		3.3	0.93
85	8.2	3.2	0.4		6.6	0.87
90	8.6	4.3	0.5		9.0	0.83
95	9.1	5.2	0.6		11.0	0.81
100	9.6	6.0	0.7		12.9	0.79
105	10.1	6.7	0.7		14.8	0.77
110	10.6	7.4	0.8		16.5	0.75
115	11.0	8.1	0.8		18.2	0.74
120	11.5	8.7	0.9		19.9	0.73
125	12.0	9.4	0.9		21.5	0.71
130	12.5	10.0	0.9	0.6	19.6	0.65
135	13.0	10.6	1.0	0.7	21.3	0.64
140	13.4	11.2	1.0	0.7	23.0	0.63
145	13.9	11.7	1.0	0.8	24.7	0.62
150	14.4	12.3	1.0	0.8	26.3	0.62
200	19.2	17.7	1.2	1.0	42.1	0.58
250	24.0	22.8	1.3	1.1	57.5	0.56
300	28.8	27.8	1.3	1.2	72.7	0.55
350	33.6	32.8	1.3	1.3	87.8	0.54
400	38.4	37.7	1.4	1.3	103.0	0.53
450	43.2	42.5	1.4	1.3	118.1	0.53
500	48.0	47.4	1.4	1.4	133.2	0.53
550	52.8	52.3	1.4	1.4	148.3	0.52
600	57.6	57.1	1.4	1.4	163.4	0.52
650	62.4	61.9	1.5	1.4	178.5	0.52
700	67.2	66.8	1.5	1.4	193.6	0.52
750	72.0	71.6	1.5	1.4	208.6	0.52
800	76.8	76.4	1.5	1.4	223.7	0.52
850	81.6	81.3	1.5	1.4	238.8	0.52
900	86.4	86.1	1.5	1.5	253.9	0.51
950	91.2	90.9	1.5	1.5	269.0	0.51
1000	96.0	95.7	1.5	1.5	284.1	0.51

Attachment 2

Revised Calculations for Nearfield Model

Evolution of clean perimeter ratio

Assumptions and Basis for Calculation:
plume half-width b = 0.096*X from Sobey, 1994
X ranges from 25 to 1000 feet
plumes merge at X = 78.125 feet
at 78.125 feet clean perimeter ratio = 1.0
individual plume encounters surface at X = 105 feet
merged plume reaches surface at X = 130 feet

X	b	y	theta1		theta2		theta3		Perimeter (in)	Perimeter (out)	clean ratio
(feet)	(feet)	(feet)	(rad)	(deg)	(rad)	(deg)	(rad)	(deg)	(feet)	(feet)	
0	0.0										1.000
25	2.4										1.000
50	4.8										1.000
78.125	7.5	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.0	47.1	1.000
80	7.7	1.7	0.22	12.4	0.22	12.4	0.00	0.0	3.3	44.9	0.931
85	8.2	3.2	0.40	23.2	0.40	23.2	0.00	0.0	6.6	44.7	0.871
90	8.6	4.3	0.52	29.8	0.52	29.8	0.00	0.0	9.0	45.3	0.835
95	9.1	5.2	0.61	34.7	0.61	34.7	0.00	0.0	11.0	46.3	0.807
100	9.6	6.0	0.67	38.6	0.67	38.6	0.00	0.0	12.9	47.4	0.785
105	10.1	6.7	0.73	41.9	0.73	41.9	0.13	7.2	14.8	46.0	0.757
110	10.6	7.4	0.78	44.7	0.78	44.7	0.33	18.7	16.5	42.9	0.723
115	11.0	8.1	0.82	47.2	0.82	47.2	0.44	25.1	18.2	41.5	0.695
120	11.5	8.7	0.86	49.4	0.86	49.4	0.52	29.8	19.9	40.6	0.671
125	12.0	9.4	0.90	51.3	0.90	51.3	0.59	33.6	21.5	39.8	0.650
130	12.5	10.0	0.93	53.1	0.93	53.1	0.64	36.7	23.1	39.3	0.630
135	13.0	10.6	0.95	54.6	0.88	50.5	0.69	39.5	23.8	39.8	0.626
140	13.4	11.2	0.98	56.1	0.84	48.1	0.73	41.9	24.4	40.3	0.623
145	13.9	11.7	1.00	57.4	0.80	45.9	0.77	44.1	25.1	40.9	0.620
150	14.4	12.3	1.02	58.6	0.77	44.0	0.80	46.0	25.8	41.6	0.617
200	19.2	17.7	1.17	67.0	0.55	31.4	1.02	58.6	33.0	48.4	0.595
300	28.8	27.8	1.31	74.9	0.35	20.3	1.22	69.7	47.9	63.0	0.568
400	38.4	37.7	1.37	78.7	0.26	15.1	1.31	74.9	62.9	78.0	0.554
500	48.0	47.4	1.41	81.0	0.21	12.0	1.36	78.0	77.9	93.0	0.544
600	57.6	57.1	1.44	82.5	0.17	10.0	1.40	80.0	93.0	108.1	0.537
700	67.2	66.8	1.46	83.6	0.15	8.6	1.42	81.4	108.1	123.1	0.533
800	76.8	76.4	1.47	84.4	0.13	7.5	1.44	82.5	123.2	138.2	0.529
900	86.4	86.1	1.48	85.0	0.12	6.6	1.45	83.4	138.2	153.2	0.526
1000	96.0	95.7	1.49	85.5	0.10	6.0	1.47	84.0	153.3	168.3	0.523

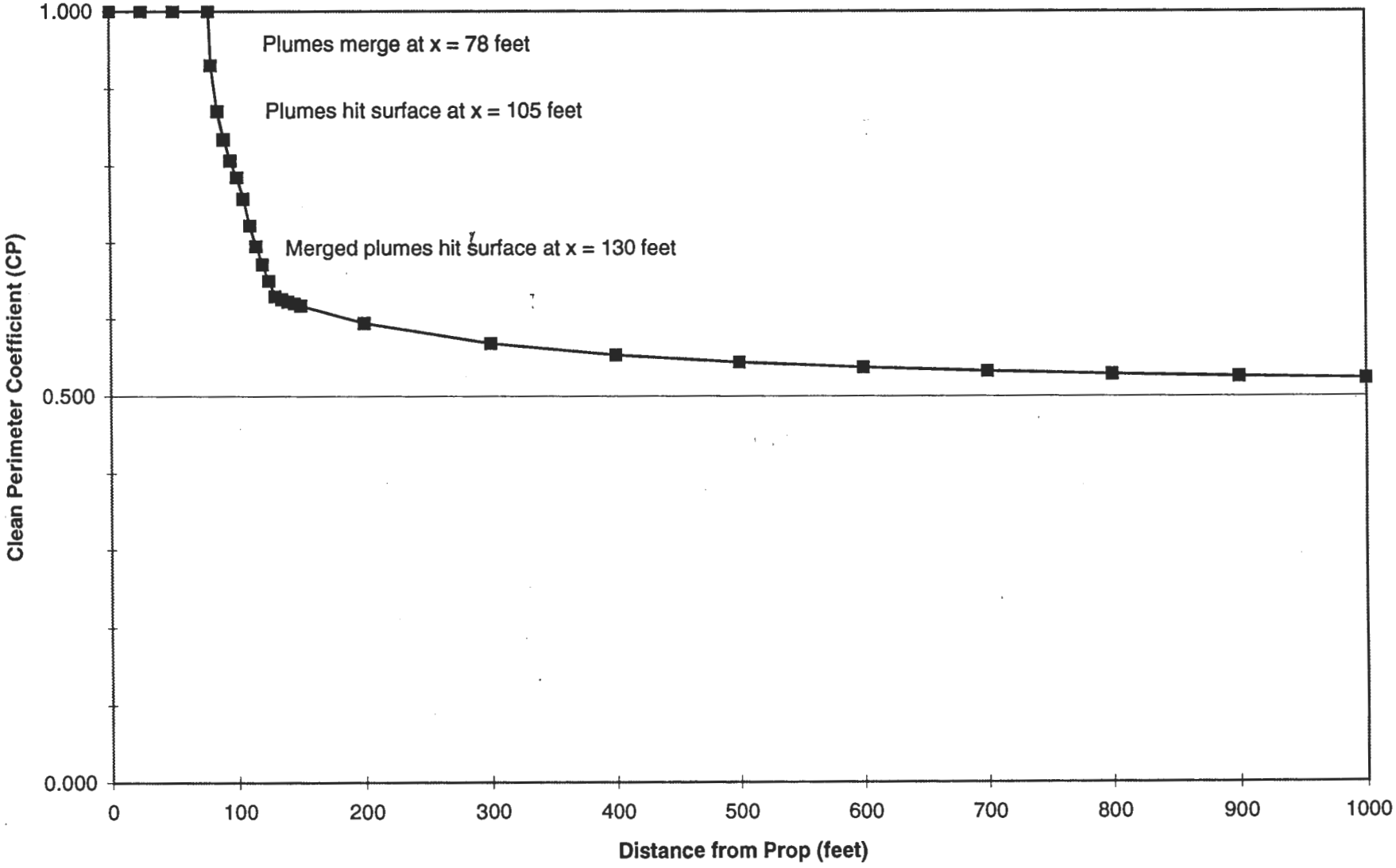
The inside perimeter is equal to (theta 1 + theta 2) times the radius of the plume: $p(in) = (\Theta_1 + \Theta_2)r$

The outside perimeter is equal to (2 pi - 2 theta 3 - theta 1 - theta 2) times the radius of the plume: $p(out) = (2\pi - 2\Theta_3 - \Theta_1 - \Theta_2)r$

The clean perimeter coefficient (CP) is equal to 1 minus the inside perimeter divided by the sum of the inside and the outside perimeters:

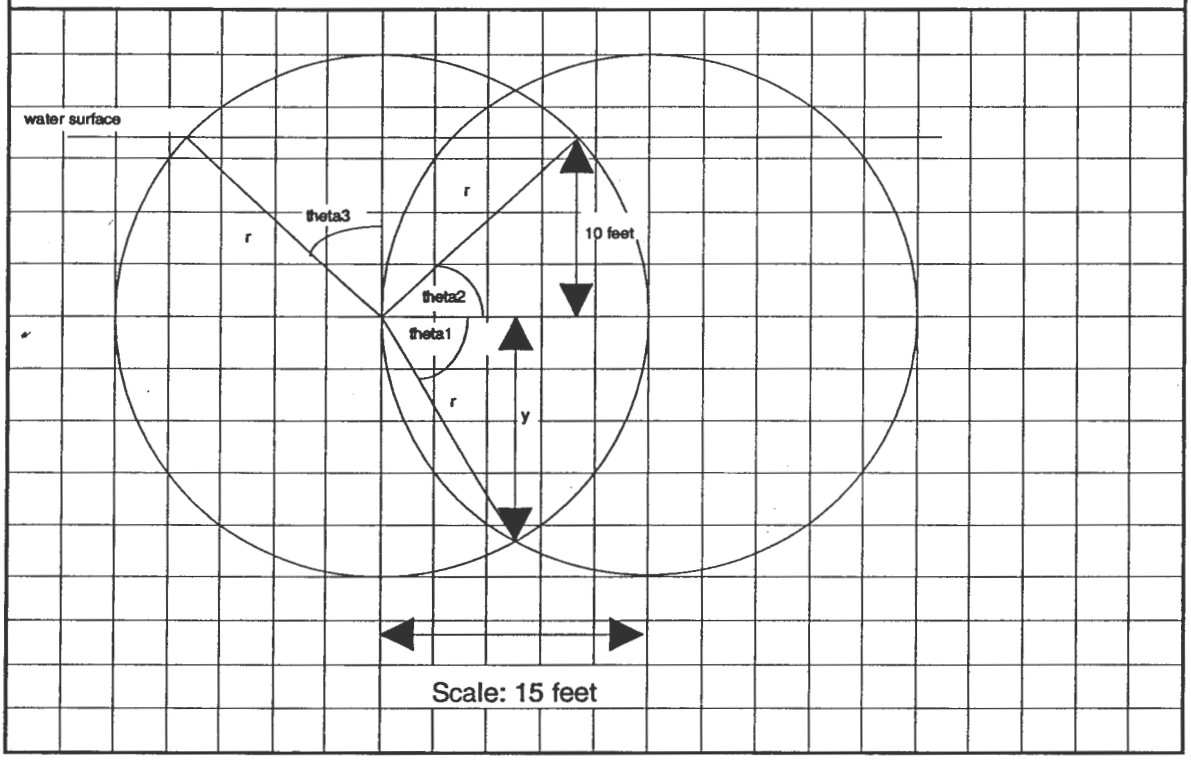
$$CP = 1 - \frac{p(in)}{p(in) + p(out)}$$

Clean Perimeter Coefficient vs. Distance from Props



Plumes from Adjacent Propellers - with Surface Boundary

caled by the ratio of the perimeter inside the adjacent plume to the total perimeter available for entrainment.
hereby defined as the clean perimeter coefficient (CP).
rainment is uniform over the perimeter of the plume. Propellers located 15 feet apart and 10 feet below water surface.
s calculated as r = 0.096X, where X is the distance downstream of the props.
eter coefficient develops in four distinct steps based on plume radius r.
umes merge, CP = 1.0, as the plumes have not interferred with each other. [X<78.125 feet]
plumes merge but before the tops of theindividual plumes hit the surface. [78.125<X<105 feet]
individual plumes hit the surface, but before the merged area hits the surface. [105<X<130 feet]
merged area hits the surface. [130<X]



Attachment 3

Revised Summary Results Tables

Table 3.4

Farfield Dilution Model Results

Ocean Current (knots)	Vessel Speed (knots)	Dilution	
		Winter Conditions	Summer Conditions
Dilution at 2.5 Nautical Miles Down Current			
0.4	6	29.6	20.0
	10	17.9	12.1
0.8	6	27.6	18.6
	10	16.6	11.2
Dilution at 5 Nautical Miles Down Current			
0.4	6	766	51.5
	10	46.1	31.5
0.8	6	59.1	39.7
	10	35.5	23.9

Table 4.1
Predicted Dilution and Concentration at the Down Current Edge of the Ocean Dumping Zone (at 2.5 nautical miles)

Season	Ocean Current (knots)	Vessel Speed (knots)	Loading (gpm)	Dumping Dilution	Nearfield Dilution	Farfield Dilution	Total Dilution	Final Concentration C/Co	Final Concentration (mg/l)
Winter	0.4	6	840	796.2	41.5	29.6	978,052	0.000001022	0.001022
Winter	0.4	10	1400	731.4	41.5	17.9	543,320	0.000001841	0.001841
Winter	0.8	6	720	796.2	41.5	27.6	911,967	0.000001097	0.001097
Winter	0.8	10	1200	731.4	41.5	16.6	503,861	0.000001985	0.001985
Summer	0.4	6	840	931.6	41.5	20.0	773,190	0.000001293	0.001293
Summer	0.4	10	1400	855.7	41.5	12.1	429,709	0.000002327	0.002327
Summer	0.8	6	720	931.6	41.5	18.6	719,067	0.000001391	0.001391
Summer	0.8	10	1200	855.7	41.5	11.2	397,747	0.000002514	0.002514

Table 4.2
Predicted Dilution and Concentration near the Closest Reefline or Shoreline (at 5 nautical miles)

Season	Ocean Current (knots)	Vessel Speed (knots)	Loading (gpm)	Dumping Dilution	Nearfield Dilution	Farfield Dilution	Total Dilution	Final Concentration C/Co	Final Concentration (mg/l)
Winter	0.4	6	840	796.2	41.5	76.6	2,531,040	0.000000395	0.000395
Winter	0.4	10	1400	731.4	41.5	46.1	1,399,278	0.000000715	0.000715
Winter	0.8	6	720	796.2	41.5	59.1	1,952,800	0.000000512	0.000512
Winter	0.8	10	1200	731.4	41.5	35.5	1,077,535	0.000000928	0.000928
Summer	0.4	6	840	931.6	41.5	51.5	1,990,964	0.000000502	0.000502
Summer	0.4	10	1400	855.7	41.5	31.1	1,104,458	0.000000905	0.000905
Summer	0.8	6	720	931.6	41.5	39.7	1,534,782	0.000000652	0.000652
Summer	0.8	10	1200	855.7	41.5	23.9	848,764	0.000001178	0.001178

$1,000 check enclosed
Submitted to Accounting Section
by

FEB 27 1996
RECEIVED

Copy to
Alan
Otter

VAN CAMP
SEAFOOD
COMPANY, INC.

February 26, 1996

Norm Lovelace, Director
Office of Pacific Island and Native American Programs
US Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105-3901

Dear Norm:

Subject: ***Application for Ocean Dumping Permit***

The existing Ocean Dumping Permit for VCS Samoa Packing Company, Inc. (OD 93-02) expires 31 August 1996. This letter serves as an application for an ocean dumping permit to continue existing operations based on Section 102 of the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972, as amended. The following required information is submitted for this purpose:

(A) Name and Address of Applicant

VCS Samoa Packing Company, Inc.
P. O. Box 957
Pago Pago, American Samoa 96799

The applicant is the generator of the waste at its facility on Pago Pago Harbor, Tutuila Island, American Samoa.

(B) Name and Address of Transporter

Blue North Fisheries
1130 NW 45th
Seattle, Washington 98107

The proposed transporter is the same as currently transporting the waste generated by VCS Samoa Packing Company, Inc. since July 1993. This contractor, operating the *FV Tasman Sea,* is expected to continue operations in the same fashion, and using the same vessel, as under the existing permit.

4510 Executive Drive, Suite 300 San Diego, CA 92121-3029
Phone: (619) 558-9662 FAX: (619) 597-4282

(C) Description of Material to be Dumped

Material to be dumped is from selected tuna processing waste streams as follows: sludge from the existing dissolved air flotation (DAF) unit, precooker juice, and press water. Data characterizing each of these waste streams has been submitted to USEPA Region 9 and is on file. Data characterizing the combined waste streams has been submitted to USEPA and is on file.

(D) Quantity of Material to be Dumped

The quantity of material to be dumped remains the same as under the existing permit, which is 200,000 gallons per day (gpd) distributed among the three waste streams as follows: DAF sludge at 60,000 gpd, precooker water at 100,000 gpd, and press water at 40,000 gpd.

(E) Dates and Times of Disposal

Material is generated whenever the cannery is in operation. Therefore, dumping on a daily basis, every day of the year, is required. Dumping will be done during daylight hours (unless an emergency exists in which case authorization from local Coast Guard or ASEPA would be requested).

(F) Proposed Dump Site

Dumping will be done at the existing USEPA designated dump site which is described as follows: a circular area with a radius of 1.5 nautical miles centered at Latitude 14° 24.00' South and Longitude 170° 38.30' West.

(G) Proposed Method of Release

The material would be released in the same fashion as described in Special Condition 4.4 of the existing MPRSA permit (OD 93-02) Special).

(H) Process Leading to the Production of Waste Material

The material is produced during the processing of tuna (precooker water), fishmeal plant processing (press water), and the treatment of other tuna processing waste streams not being disposed of by ocean dumping (DAF sludge) at the VCS Samoa Packing cannery in American Samoa. A flow diagram showing the origins of the three waste streams to be dumped has been submitted to USEPA and ASEPA with previous Ocean Dumping Permit applications and in the existing NPDES permit application.

(I) Previous Method of Disposal

The material has been disposed of by ocean dumping at USEPA designated dump sites since 31 July 1990 under previous (OD 90-02 Special) and existing (OD 93-02) permits.

(J) Need for Dumping

The need for ocean dumping in American Samoa was documented in *The Final Environmental Impact Statement for the Designation of an Ocean Disposal Site off Tutuila Island, American Samoa for Fish Processing Wastes"* (USEPA Region 9, 24 February 1989). The EIS investigated alternative means of disposal (Chapter II), and ocean dumping was determined to be the best approach to maintain cannery operation and concomitant economic benefits to American Samoa, and concurrently protect water quality in Pago Pago Harbor. Without an ocean dumping permit the tuna canneries would not be able to operate in American Samoa.

(K) Environmental Impact of Ocean Dumping

Environmental impacts were described in the EIS (Chapter IV) referenced in *(J)* above. All of the potential impacts were classified as: insignificant adverse impact, no impact, or beneficial impact. Data have been collected on a monthly basis at the dump site and are on file with USEPA. There has been no documented adverse impact at the site, which is approximately 5.5 nautical miles offshore of Tutuila Island, since the designation of the ocean dump site by USEPA. Analysis of impacts on a previous dump site (two miles closer to shore, and used before 1988 under a research permit) in the EIS indicated no transport of material to the shoreline. Under the existing permit toxicity to marine organisms (using bioassay tests) and the predicted dilution of the wastefield (using appropriate modeling techniques) were investigated. Summaries of these data, previously submitted to USEPA, indicate that the rapid dilution achieved with the normal dumping procedures results in limited and insignificant impacts to marine life.

If you have any questions regarding this application, please contact me at 619-597-4212.

Sincerely,

James L. Cox

James L. Cox
Director of Engineering and
Environmental Affairs

JLC:ms
022696J1

VCS - SAMOA PACKING [redacted]MPANY

CHECK [redacted]UB 015178

VCS 7001A

VCS SAMOA PACKING CO.	NET AMOUNT $1,000.00	SUPPLIER NAME U.S. EPA	ATT

DATE	AMOUNT	INVOICE DESCRIPTION
2/26/96	$1,000.00	VCS SAMOA PACKING OCEAN DUMPING PERMIT FEES

Rec'd 2-27-96 D. Cottrell

This check is printed with a specially designed security background. This check is void if "VCS SAMOA PACKING" is not repeated in green background.

VCS - SAMOA PACKING COMPANY
P.O. BOX 957
PAGO PAGO, AMERICAN SAMOA 96799

015178 64-1327 611

LOC./SUPPLIER NO. 403/

DATE	BANK CODE	CHECK
2/26/96	10	015178

VOID 90 DAYS AFTER DATE

AMOUNT ***1,000.00***

AY EXACTLY

ONE THOUSAND DOLLARS AND 00 CENTS

Mark Q. Huggins
CHIEF FINANCIAL OFFICER

Robert S. Blatt - Controller

achovia Bank of Georgia, N.A.
ugusta, GA 30903

"015178" :061113279: 07 503 082 "

StarKist Samoa, Inc.

A Subsidiary of Star-Kist Foods, Inc.

P.O. Box 368
Pago Pago, Tutuila Island
American Samoa 96799

Telephone: 684 644-4231
Facsimile: 684 644-2440

February 23, 1996

MAR 6 1996
RECEIVED

The Regional Administrator
US Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105-3901

Subject: **Application for Ocean Dumping Permit**

Dear Sir:

Pursuant to Section 102 of the Marine Protection, Research and Sanctuaries Act (MPRSA) of 1972, as amended, StarKist Samoa, Inc., hereby submits its application for an Ocean Dumping permit.

A) **Name and address of applicant:** StarKist Samoa, Inc.
P.O. Box 368
Pago Pago, American Samoa 96799

B) **Proposed name of transporter:** Blue North Fisheries
1130 NW 45111
Seattle, Washington 98107

C) **Description of material to be dumped:** Tuna sludge from the dissolved air flotation unit, cooker juice and press liquor. Extensive data on the characteristics of each waste stream are on file at USEPA Region 1X office.

D) **Quantity of material to be dumped:** Two hundred thousand (200,000) U.S. gallons per day.

E) **Proposed dates and times of disposal:** Material is generated whenever StarKist Samoa, Inc. is in operation. Daily dumping of up to 200,000 U.S. gallons is required.

F) **Proposed dumping site:** EPA designated dump site is described as a circular area with a 1.5 nautical mile radius, centered at 14° 24.00′ South latitude by 170° 38.30′ West longitude.

G) **Proposed method of release:** The proposed method of release and control would be the same as those delineated in the current MPRSA Ocean Dumping Permit #OD 93-01 Special.

H) **Process or activities giving rise to the production of the material:** The material is processed during the tuna canning process in American Samoa.

I) **Previous method of disposal:** The material has been ocean dumped at the EPA designated dump site since July 31, 1990 under StarKist Samoa Inc.s' existing MPRSA Ocean Dumping Permit #OD 93-01 Special.

J) **Need for the proposed dumping:** The need for ocean dumping in American Samoa has been demonstrated in EPA Region IX's Final Environmental Impact Statement for the Designation of an Ocean Disposal Site off Tutuila Island, American Samoa for Fish Processing Wastes, February 24, 1989. Without an ocean dumping permit, the canneries would not be able to operate in American Samoa and the resultant economic impact on the local economy would be severe.

K) **Impact of ocean dumping:** The environmental impact of ocean dumping in American Samoa has been demonstrated in EPA Region IX's Final Environmental Impact Statement for Designation of an Ocean Disposal Site off Tutuila Island, American Samoa for Fish Processing Wastes, February 24, 1989. Data have been collected monthly at the dump site on the impact of the ocean dumping operation.

There has been no documented adverse impact of the ocean dumping operation since its inception with the designated site some 5.45 nautical miles from shore. Even in the pre-1988 period when the canneries were ocean dumping under the authority of a USEPA Research Permit at a designated site that was two nautical miles closer to shore, there were no documented evidence of sludge being washed onshore. Such conclusions were reached in USEPA's Final Environmental Impact Statement for the Designation of an Ocean Disposal Site off Tutuila Island, American Samoa for Fish Processing Wastes, February 24, 1989.

The transporter, Blue North Fisheries, has been under contract with StarKist Samoa, Inc. since July 1993 to operate the current Ocean Dumping Permit. It is expected that the contract will be extended and the existing vessel F/V Tasman Sea will continue to be used in the operation under Blue North Fisheries' experienced crew and management.

Enclosed please find a check for $1,000.00 to cover the processing fees in accordance with 40 CFR 221.5.

If there are any questions concerning this permit application, please contact the undersigned or Norman Wei of our Corporate Office at 310 - 519 - 2807.

Sincerely,

STARKIST SAMOA, INC.

Barry A. Mills
President & General Manager

CC: Clifford Johnson
Norman Wei
Virgil Shouse
Attachment - 1

	PURCHASE ORDER	INVOICE DATE	AMOUNT	DISCOUNT	NET AMOUNT
AN DUMPIN	S74820	02-27-96	1,000.00	.00	1,000.00
TOTALS			1,000.00	.00	1,000.00

SAMOA, INC.
BOX 368

50042130

DATE	CHECK	NET AMOUNT
03/01/96	50042130	******1,000.00

E THOUSAND DOLLARS AND 00 CENTS

US ENVIRONMENT PROTECTION AGENC
75 HAWTHORNE STREET
SAN FRANCISCO, CA 94100

⑈50042130⑈ ⑆121404006⑆ 0034⑈003939⑈

Rec'd

OLD — To be revised for new permit

MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT § 102
OCEAN DUMPING PERMIT

PERMIT NUMBER AND TYPE: OD 93-02 Special

EFFECTIVE DATE: Sepetmber 1, 1993

EXPIRATION DATE: August 31, 1996

PERMITTEE:
VCS Samoa Packing Company, Inc.
P.O. Box 957
Pago Pago, American Samoa 96799

WASTE GENERATOR:
VCS Samoa Packing Company, Inc.
P.O. Box 957
Pago Pago, American Samoa 96799

WASTE GENERATED AT:
VCS Samoa Packing Company, Inc.
P.O. Box 957
Pago Pago, American Samoa 96799

PORT OF DEPARTURE: Pago Pago Harbor, American Samoa

WASTE TRANSPORTER:
FV TASMAN SEA
Blue North Fisheries, Inc.
1130 N.W. 45th Street
Seattle, Washington 98107-4626

A special ocean dumping permit is being issued to VCS Samoa Packing, Inc. because the Regional Administrator of EPA Region IX has determined that disposal of fish processing wastes off American Samoa meets EPA's ocean dumping criteria at 40 C.F.R. Parts 227 and 228. For this permit, the term "fish processing wastes" shall refer to Dissolved Air Flotation (DAF) Sludge, Precooker Water and Press Water generated at the permittee's plant in Pago Pago, American Samoa; or any combination of the three waste streams pumped from VCS Samoa Packing's onshore holding tanks into the ocean disposal vessel for transportation to the ocean disposal site.

This special permit authorizes the transportation and dumping into ocean waters of fish processing wastes as described in the special conditions section pursuant to the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 (33 U.S.C. § 1401 *et seq.*) as amended (hereinafter referred to as "the Act"); regulations issued thereunder; and the terms and conditions stated below.

This MPRSA Special Permit does not contain any information collection requirements subject to Office of Management and Budget review under the Paper Work Reduction Act of 1980 (44 U.S.C. § 3501 *et seq.*). This determination has been made because the permit does not require data collection by more than 10 persons.

1. GENERAL CONDITIONS

1.1. Operation under this special ocean dumping permit shall conform to all applicable federal statutes and regulations including, but not limited to, the Act, the Marine Plastic Pollution

Research and Control Act of 1987 (P.L. 100-220), the Clean Water Act (33 U.S.C. § 1251 *et seq.*), and the Ports and Waterways Safety Act (33 U.S.C. § 1221 *et seq.*).

1.2. All transportation and dumping authorized herein shall be undertaken in a manner consistent with the terms and conditions of this permit. VCS Samoa Packing, Inc. (hereafter referred to as "the permittee") shall be liable for compliance with all such terms and conditions. The permittee shall be held liable under § 105 of the Act (33 U.S.C. § 1415) if any permit violations occur. During disposal operations when the permittee's fish processing wastes are loaded aboard the disposal vessel in holding tanks, either separately or combined with similar fish processing wastes from other permittees authorized to use the ocean disposal site defined in Special Condition 2.2, the permittees shall be held individually liable under § 105 of the Act (33 U.S.C. § 1415) if a permit violation occurs. If a permit violation occurs during the transportation and disposal of fish processing wastes, the waste transporter may also be liable for permit violations.

1.3. Under § 105 of the Act, any person who violates any provision of the Act, 40 C.F.R. Parts 220 through 228 promulgated thereunder, or any term or condition of this permit shall be liable for a civil penalty of not more than $50,000 per day for each violation. Additionally, any knowing violation of the Act, 40 C.F.R. Parts 220 through 228, or the permit may result in a criminal action being brought with penalties of not more than $50,000 or one year in prison, or both. Violations of the Act or the terms and conditions of this permit include but are not limited to:

1.3.1. Transportation to, and dumping at any location other than that defined in Special Condition 2.2 of this permit;

1.3.2. Transportation and dumping of any material not identified in this permit, more frequently than authorized in this permit, or more than the quantities identified in this permit, unless specifically authorized by a written modification hereto;

1.3.3. Failure to conduct permit monitoring as required in Special Conditions 3.1, 3.3.1, 4.7 and 5.1; or

1.3.4. Failure to file reports on fish processing wastes and disposal site monitoring reports as required in the Special Conditions.

1.4. Nothing contained herein shall be deemed to authorize, in any way, the transportation from the United States for the purpose of dumping into the ocean waters, the territorial sea, or the contiguous zone, the following materials:

1.4.1. High-level radioactive wastes;

1.4.2. Materials, in whatever form, produced for radiological, chemical, or biological warfare;

1.4.3. Persistent synthetic or natural materials which may float or remain in suspension in the ocean; or

1.4.4. Medical wastes as defined in § 3(k) of the Act.

1.4.5. Flotables, garbage, domestic trash, waste chemicals, solid waste, or any materials prohibited by the Act or the Marine Plastic Pollution Research and Control Act.

1.5. Nothing contained herein shall be deemed to authorize, in any way, violation of applicable American Samoa Water Quality Standards. The following water quality standards apply:

Table 1. 1989 American Samoa Water Quality Standards: Oceanic Waters [§24.0207(g)(1-7)].

Parameter	Median Not to Exceed the Given Value
Turbidity	0.20 NTU
Total Phosphorus	11.0 μg-P/L
Total Nitrogen	115.0 μg-N/L
Chlorophyll *a*	0.18 μg/L
Light Penetration Depth	150 feet, to exceed the given value 50% of the time.
Dissolved Oxygen	Not less than 80% of saturation or less than 5.5 mg/L. If the natural level of dissolved oxygen is less than 5.5 mg/L, then the natural dissolved oxygen level shall become the standard.
pH	The pH range shall be 6.5 to 8.6 pH units and within 0.2 pH units of the level which occurs naturally.

1.6. After notice and opportunity for a hearing, this permit may be revised, revoked or limited, in whole or in part, subject only to the provisions of 40 C.F.R. §§ 222.3(b) through 222.3(h) and 40 C.F.R. § 223.2, as a result of a determination by the Regional Administrator of EPA that:

1.6.1. The cumulative impact of the permittee's dumping activities or the aggregate impact of all dumping activities in the dump site designated in Special Condition 2.2 should be categorized as Impact Category I, as defined in 40 C.F.R. § 228.10(c)(1);

1.6.2. There has been a change in circumstances regarding the management of the disposal site designated in Special Condition 2.2;

1.6.3. The dumping authorized by the permit would violate applicable American Samoa Water Quality Standards;

1.6.4. The dumping authorized can no longer be carried out consistent with the criteria defined at 40 C.F.R. Parts 227 and 228;

1.6.5. The permittee violated any term or condition of the permit;

1.6.6. The permittee misrepresented, or did not disclose all relevant facts in the permit application accurately; or

1.6.7. The permittee did not keep records, engage in monitoring and reporting activities, or to notify appropriate officials in a timely manner of the transportation and dumping activities as specified in any condition of this permit.

1.7. The permittee shall ensure always that facilities, including any vessels associated with the permit, are in good working order to achieve compliance with the terms and conditions of this permit. During all loading operations, there shall not be a loss of fish processing wastes to any waterway. During transport to the disposal site, there shall not be a loss of fish processing wastes to Pago Pago Harbor or the ocean.

1.8. Any change in the designated fish processing waste transporter may be made at the discretion of the Regional Administrator or his delegate. A written request for such a transfer shall be made by the permittee at least thirty (30) days before the requested transfer date. Written approval by the EPA Regional Administrator must be obtained before such a transfer occurs.

1.9. The permittee shall allow the EPA Regional Administrator, the Commander of the Fourteenth U.S. Coast Guard District (USCG), the Director of the American Samoa Environmental Protection Agency (ASEPA), and/or their authorized representatives to:

1.9.1. Enter into, upon, or through the permittee's premises, vessels, or other premises or vessels under the control of the permittee, where, or in which, a source of material to be dumped is located or in which any records are required to be kept under the terms and conditions of this permit or the Act;

1.9.2. Have access to and copy any records required to be kept under the terms and conditions of this permit or the Act;

1.9.3. Inspect any dumping equipment, navigational system equipment, monitoring equipment or monitoring methods required in this permit;

1.9.4. Sample or require that a sample be drawn, under EPA, USCG, or ASEPA supervision, of any materials discharged or to be discharged; or

1.9.5. Inspect laboratory facilities, data, and quality control records required for compliance with any condition of this permit.

1.10. Material which is regulated by this permit may be disposed of, due to an emergency, to safeguard life at sea in locations or in a manner that does not comply with the terms of this permit. If this occurs, the permittee shall make a full report, according to the provisions of 18 U.S.C. § 1001, within 15 days to the EPA Regional Administrator, the USCG and the ASEPA describing the conditions of this emergency and the actions taken, including the location, the nature and the amount of material disposed.

1.11. The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of rights, nor any infringement of Federal, State or local laws or regulations, nor does it obviate the necessity of obtaining State or local assent required by applicable law for the activity authorized.

1.12. This permit does not authorize or approve the construction of any onshore or offshore physical structures or facilities, or, except as authorized by this permit, the conduct of any work in any navigable waters.

1.13. Unless otherwise provided for herein, all terms used in this permit shall have the meanings assigned to them by the Act or 40 C.F.R. Parts 220 through 228, issued thereunder.

2. SPECIAL CONDITIONS - DISPOSAL SITE AND FISH PROCESSING WASTE CHARACTERIZATION

Special conditions are necessary to define the length of the permit period, identify the disposal site location, describe fish processing waste streams and define maximum permitted limits for DAF Sludge, Precooker Water and Press Water.

2.1. Location of the Waste Generator and Duration of the Permit

2.1.1. The material to be dumped shall consist of fish processing wastes, defined in Special Conditions 2.3 and 2.4, generated at the permittee's fish cannery in Pago Pago, American Samoa.

2.1.2. This permit shall become effective on September 1, 1993 and it shall expire three years from the effective data at midnight on August 31, 1996.

2.2. Location of Disposal Site

Disposal of fish processing wastes generated at the location defined in Special Condition 2.1.1 shall be confined to a circular area with a 1.5 nautical mile radius, centered at 14° 24.00' South latitude by 170° 38.30' West longitude.

2.3. Description of Fish Processing Wastes

2.3.1. During the term of this permit, and according to all other terms and conditions of this permit, the permittee is authorized to transport and dispose a maximum of 200,000 gallons per day of fish processing wastes pumped from a storage tank on the permittee's premises. The fish processing wastes pumped from the permittee's storage tank are authorized for disposal at the designated ocean disposal site. Fish processing wastes pumped into the permittee's onshore storage tanks shall not exceed the following amounts:

Table 2. Volumes of Fish Processing Wastes Generated Each Day by VCS Samoa Packing and Pumped into a Storage Tank before Loading into the Ocean Disposal Vessel.

Fish Processing Waste	Maximum Volume Generated (gallons/day)
Dissolved Air Flotation (DAF) Sludge	60,000
Precooker Water	100,000
Press Water	40,000
Maximum Daily Volume Generated and Pumped into a Storage Tank before Loading into the Disposal Vessel	??

2.4. **Fish Processing Waste Stream Limits**

Table 3. Limits for DAF Sludge, Precooker Water and Press Water.

Physical or Chemical Parameter (units)[a]	DAF Sludge	Precooker Water	Press Water
Total Solids (mg/L)	461,790	115,180	381,510
Total Volatile Solids (mg/L)	455,560	84,450	409,310
5-Day BOD (mg/L)	349,350	64,650	365,550
Oil and Grease (mg/L)	395,700	11,180	165,860
Total Phosphorus (mg/L)	3,790	1,850	2,950
Total Nitrogen (mg/L)	21,820	12,830	35,100
Ammonia (mg/L)	3,470	410	830
pH (pH units)	4.8 to 7.0	5.5 to 7.0	5.5 to 7.0
Density (g/mL)	0.86 to 1.05	0.95 to 1.06	0.96 to 1.06

a = All calculated values were rounded to the nearest 10, except density and pH ranges.

2.4.2. Permitted Maximum Concentrations for each type of fish processing waste stream were calculated based on an analysis of historical data from the permittee's previous Special Ocean Dumping Permit, number OD 90-01. The calculations followed EPA's recommended procedure for determining permit limits as defined in the EPA document titled: "Guidance Document for Ocean Dumping Permit Writers" (January 30, 1988). EPA Region IX will periodically review these limits during the permit to evaluate the accuracy of the limits. If revisions are necessary, EPA Region IX will make changes according to the authority defined in the Ocean Dumping Regulations at 40 C.F.R §§ 223.2 through 223.5.

2.4.3. The Permitted Maximum Concentrations, density range and pH range listed above, shall not be exceeded at any time during the term of this permit.

3. SPECIAL CONDITIONS - ANALYSIS OF FISH PROCESSING WASTES

Compliance with the permitted maximum concentrations defined in Special Condition 2.4 shall be determined by monthly monitoring of **each of the fish processing waste streams**. Additional analyses of fish processing wastes and reporting requirements are defined in this section. Any fish processing waste stream sampling dates shall be scheduled within the first two weeks of the month to allow enough time for laboratory analyses and report writing to comply with Special Condition 3.3.

3.1. **Analyses of Fish Processing Wastes**

3.1.1. Concentrations or values of the parameters listed in Special Condition 2.4 and those listed in the table below shall be determined for each fish processing waste stream. A sample of each fish processing waste stream shall be taken before the individual streams are mixed and pumped into an onshore storage tank. A sample shall consist of three replicate grab samples, taken on the day that sampling is scheduled, pooled for use as a composite sample. The detection limits specified in Table 4 shall be used in all fish processing waste stream analyses.

Table 4. Physical and Chemical Parameters to be Analyzed from Individual Samples of DAF Sludge, Precooker Water and Press Water.

Parameter	Method Detection Limit
Total Solids	10.0 mg/L
Total Volatile Solids	10.0 mg/L
5-Day BOD	10.0 mg/L
Oil and Grease	10.0 mg/L
Total Phosphorus	1.0 mg/L
Total Nitrogen	1.0 mg/L
Ammonia	1.0 mg/L
pH	0.1 pH units
Density	0.01 g/mL

3.1.2. In addition to the fish processing waste stream samples taken under Special Condition 3.1.1, the permittee shall analyze samples taken from its onshore fish processing waste storage tank during the transfer of these wastes to the disposal vessel's holding tanks.

3.1.2.1. Three samples shall be taken from the onshore storage tank transfer line at 10 minute intervals. These samples shall be composited to produce one sample for analysis. The permittee's samples shall not be combined with fish processing waste from any other permittee.

3.1.2.2. Samples described in Special Condition 3.1.2.1 shall be taken for 12 months. Samples shall be collected on the same day that samples are taken for analysis under Special Condition 3.1.1 and another sample shall be taken one week later.

3.1.2.3. The same parameters and detection limits listed in Table 4 shall be analyzed and used for the onshore storage tank composite samples. This sampling and analysis program will provide 2 samples per month for 12 months yielding 24 samples.

3.1.2.4. The permittee shall send a copy of the analytical data for the onshore storage tank samples to EPA Region IX every 3 months during the 12-month sampling period. EPA Region IX will use these results to calculate limits for the onshore storage tank fish processing wastes.

When the onshore storage tank limits are calculated, EPA Region IX will evaluate whether to amend this permit using the new limits.

3.1.3. All sampling procedures, analytical protocols, and quality control/quality assurance procedures shall be performed according to guidelines specified by EPA Region IX. The following references shall be used by the permittee:

3.1.3.1. 40 C.F.R. Part 136, EPA Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act;

3.1.3.2. Tetra Tech, Incorporated. 1985. Summary of U.S. EPA-approved Methods, Standard Methods and Other Guidance for 301(h) Monitoring Variables. Final program document prepared for the Marine Operations Division, Office of Marine and Estuarine Protection, U.S. Environmental Protection Agency. EPA Contract No. 68-01-693. Tetra Tech, Incorporated, Bellevue, Wa.; and

3.1.3.3. Environmental Protection Agency. 1987. Quality Assurance and Quality Control for 301(h) Monitoring Programs: Guidance on Field and Laboratory Methods. Office of Marine and Estuarine Protection, Washington, D.C. EPA 430/9-86-004.

3.2. Analytical Laboratory

3.2.1. Within 30 days of the effective date of this permit, the name and address of the contract laboratory or laboratories and a description of all analytical test procedures and quality assurance/quality control procedures, including detection limits being used, shall be provided for EPA Region IX approval.

3.2.2. Any potential variation or change in the designated laboratory or analytical procedures shall be reported, in writing, for EPA Region IX approval.

3.2.3. EPA Region IX may require analyses of quality control samples by any laboratories employed to comply with Special Condition 3.1 and Appendix A. Upon request, the permittee shall provide EPA Region IX with the analytical results from such samples.

3.2.4. A complete analysis of parameters, required in Special Condition 3.1, shall be made by the permittee and reported to EPA Region IX and the ASEPA whenever there is a significant change in the quality of a fish processing waste stream as determined by EPA Region IX or the ASEPA. If necessary, bioassays may be required in addition to parameter analyses.

3.3. Reporting

3.3.1. The permittee shall provide EPA Region IX, ASEPA, the National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service (USFWS) and the Western Pacific Regional Fishery Management Council (WPRFMC) with a report, prepared every 3 months during the permit period, that contains the following information:

3.3.1.1. Daily volumes of DAF Sludge, Precooker Water and Press Water generated at the permittee's facility and pumped into the permittee's onshore storage tanks. These volumes shall be reported in gallons per day using Form 1 (see Appendix B);

3.3.1.2. Daily volumes of fish processing wastes disposed at the ocean disposal site. These volumes shall be reported in gallons per day using Form 1 (see Appendix B);

3.3.1.3. Monthly fish processing waste stream analyses demonstrating that the fish processing wastes being dumped comply with the permitted limits of parameters listed in Special Condition 2.4 and a summary of the volumes of fish processing wastes disposed at the ocean site using Form 2 (see Appendix B);

3.3.1.4. The monthly amount of alum (aluminum sulfate) and coagulant polymer added to the fish processing waste streams reported in pounds per month (see Forms 1 and 2).

3.3.2. Such reports, including a comparison with the permit limits as required on Forms 1 and 2, shall be submitted to EPA Region IX, ASEPA, NMFS USFWS and WPRFMC within 45 days of the end of the preceding 3-month period for which they were prepared. The reports shall be submitted within this time unless extenuating circumstances are communicated to EPA Region IX and the ASEPA in writing. In addition to a hard copy of Forms 1 and 2, the data contained on Form 1 shall be submitted to EPA Region IX on a 3.5" computer diskette in a format compatible with LOTUS version 2.2.

3.3.3. A summary report of all 3-month reports listed in Special Condition 3.3.1, including a comparisons with permit limits and a detailed discussion of the summary results, shall be submitted by the permittee to EPA and the ASEPA 45 days after the permit expires. All fish processing waste stream data shall be reported in the same format as required in Special Condition 3.3.2.

3.3.4. Upon detection of a violation of any permit condition, the permittee shall send a written notification of this violation to EPA Region IX and the ASEPA within five working days and a detailed written report of the violation shall be sent to the agencies within 15 working days. This notification shall pertain to any permit limits (defined in Special Condition 2.4) that are exceeded, violation of volume limits (defined in Table 2 under Special Condition 2.3.1), and any disposal operation that occurs outside the disposal site defined in Special Condition 2.2.

3.3.5. Eighteen months from the effective date of this special permit, the permittee shall submit a report to EPA and ASEPA on the results of suspended phase bioassay tests and reevaluation of the model used to predict the concentrations of fish processing wastes disposed at the designated site. The suspended phase bioassays shall be conducted using at least one species from each of the following three groups: Group 1 = *Mytilus* sp. (mussel), *Crassostrea* sp. (oyster), *Acartia tonsa* (copepod), or *Trypneustes* sp. (sea urchin) larvae; Group 2 = *Holmesimysis costata* (mysid shrimp) or *Penaeus vannamei* (white shrimp); and Group 3 = *Citharicthys stigmaeus* (speckled sanddab) or *Coryphaena hippurus* (dolphinfish) juveniles.

Appropriate suspended phase bioassay protocols, either protocols approved by EPA or protocols published by the American Society for Testing and Materials (ASTM), shall be followed. Suspended particulate phase bioassays shall be run using the following fish processing waste concentrations: 100%, 75%, 50%, 25%, 10%, 5%, and a control (0%). A minimum of five replicates are required per

dilution concentration. Concurrent reference toxicant tests shall be conducted when the suspended phase bioassays are run.

A sampling and testing plan shall be submitted to EPA Region IX and ASEPA by October 1, 1993 for approval before the bioassay tests are conducted. Samples for the suspended particulate phase bioassays shall be composited from the permittee's onshore storage tanks. Three samples shall be taken from the onshore storage tank transfer line at 10 minute intervals. These samples shall be composited to produce one sample for analysis. The permittee's samples shall not be combined with fish processing waste from any other permittee. The permittee shall take samples on the following dates: November 30, 1993, February 28, 1994 and May 31, 1994. Samples shall be collected and shipped to the testing laboratory according to EPA-approved methods to ensure that the samples do not change before the bioassay tests begin. All suspended particulate phase bioassays shall be started within 10 days of sampling.

The testing plan submitted by October 1, 1993 should also include a proposal to reevaluate the disposal site model using results obtained from the new series of suspended phase bioassays. These bioassays are being required to confirm the toxicity of the fish processing wastes and to reevaluate the disposal operations based on the use of a different disposal vessel.

The bioassay and computer model confirmation report shall contain the following information:

3.3.5.1. INTRODUCTION AND PROJECT DESCRIPTION

The project description should include the following information about fish processing waste toxicity, previous bioassay test results, previous modelling at the ocean disposal site, and the design of the new bioassay tests.

3.3.5.2. MATERIALS AND METHODS

Fish processing waste sampling and sample handling procedures should be described or referenced.

References for laboratory protocols for suspended phase bioassay tests.

1) EPA-approved methods and references.

2) Test species used in each test, the supplier or collection site for each test species, and QA/QC procedures for maintaining the test species.

3) Source of seawater used in reference, control and bioassay tests.

4) Data and statistical analysis procedures.

5) Limiting Permissible Concentration (LPC) calculations.

6) Description of model selected to evaluate dispersal of fish processing wastes at the ocean disposal site. Use of this model shall be approved by EPA Region IX and ASEPA before it is used by the permittee to evaluate the fish processing waste disposal plume.

3.3.5.3. DESCRIPTION OF SAMPLING PROCEDURES

QA/QC procedures and actual sampling procedures used during fish processing waste stream sampling and handling of the samples.

3.3.5.4. FINAL RESULTS, ANALYSIS OF DATA AND DISCUSSION

1) Complete bioassay data tables and summary bioassay tables shall be furnished in the report. All data tables should be typed or produced as a computer printout.

2) The permittee shall analyze the bioassay data and calculate the LPC of the material as defined at 40 C.F.R. § 227.27(a-b).

3) The permittee shall use the LPC in the approved plume model to determine the concentration of fish processing wastes disposed at the designated ocean disposal site which complies with EPA's Ocean Dumping Criteria defined at 40 C.F.R. Parts 227 and 228.

3.3.5.5. REFERENCES

This list should include all references used in the field sampling program, laboratory protocols, LPC calculations, modelling analyses, and historical data used to evaluate the fish processing waste disposal operations at the designated ocean disposal site.

3.3.5.6. DETAILED QA/QC PLANS AND INFORMATION

The following topics should be addressed in the QA Plan:

1) QA objectives.

2) Organization, responsibilities and personnel qualifications, internal quality control checks.

3) Sampling and analytical procedures.

4) Equipment calibration and maintenance.

5) Sample custody and tracking.

6) documentation, data reduction, and reporting.

7) Data validation.

8) Performance and systems audits.

9) Corrective action.

10) Reports.

4. SPECIAL CONDITIONS - VESSEL OPERATIONS

Specifications for vessel operations are defined to limit dumping activities to the dump site identified in Special Condition 2.2 and to record all dumping activities. The permittee's fish processing wastes and fish processing wastes of other authorized permittees may be loaded into the disposal vessel together or separately.

4.1. Posting of the Permit

This permit, or a true copy thereof, shall be placed in a conspicuous place on any vessel which is used for the transportation and dumping authorized by this permit.

4.2. Vessel Identification

Every vessel engaged in the transportation of fish processing wastes for ocean disposal shall have its name and number painted in letters and numbers at least fourteen (14) inches high on both sides of the vessel. The name and number shall be kept distinctly legible always, and a vessel without such markings shall not be used to transport or dump fish processing wastes.

4.3. Determination of the Disposal Location Within the Dump Site

On each disposal trip, the master of the disposal vessel shall determine the location of the disposal operation as follows:

4.3.1. The disposal vessel, as defined under WASTE TRANSPORTER on page 1 of this permit, shall proceed directly to the center of the disposal site at the location specified in Special Condition 2.2.

4.3.2. The master of the vessel shall observe the conditions at the dump site center, noting the vessel's position (latitude and longitude), wind direction and observed surface current direction.

4.3.3. After the conditions defined in Special Condition 4.3.2 have been recorded, the master of the disposal vessel shall proceed 1.1 nautical miles up current from the center of the disposal site and record the position of the disposal vessel (latitude and longitude). This position shall be the starting point for disposal operations for each disposal trip.

4.3.4. The master of the disposal vessel shall prepare a hard copy (on 8.5 inch by 11 inch paper) of the computerized navigational plot documenting compliance with the procedures defined in Special Conditions 4.3.1 through 4.3.4. The hard copy of the computerized navigational plot for each disposal trip shall be supplied to the permittee. The permittee shall submit these hard copies of the computerized navigational plots with the 3-month reports required under Special Condition 3.3.1. The hard copies of the navigational plots shall include:

4.3.4.1. The disposal vessel's course during the entire dumping operation; and

4.3.4.2. The times and location of entry and exit from the disposal site, position and time of arrival at the center of the disposal site, position and time of arrival at the location 1.1 nautical miles up current from the disposal site, beginning and ending of dumping operations, and disposal vessel position plotted every 15 minutes while dumping operations occur.

4.3.5. The master of the disposal vessel shall sign and date each hard copy of the computerized navigational plots certifying that the hard copies are an accurate record of the disposal vessel's track for each disposal trip.

4.3.6. The master of the disposal vessel shall certify that disposal operations occurred in the manner required by the permit.

4.3.7. The procedures listed in Special Conditions 4.3.1 through 4.3.6 shall be repeated for each disposal trip.

4.4. Disposal Rate and Vessel Speed

4.4.1. The disposal vessel/barge shall discharge the material authorized by this permit beginning at the disposal location as determined by Special Condition 4.3.3. The vessel track shall be in a direction that is perpendicular to the current detected at the center of the disposal site as defined in Special Condition 2.2. Disposal shall occur in a oval shape along an axis at least 0.5 nautical miles on either side of the starting point determined in Special Condition 4.3.3. The entire disposal vessel track shall be within the disposal site boundaries.

4.4.1.1. From June 1 through November 30, fish processing wastes shall be pumped from the disposal vessel into the ocean at a rate of 140 gallons per minute per knot, not to exceed 1,400 gallons per minute at a maximum speed of 10 knots.

4.4.1.2. From December 1 through May 31, fish processing wastes shall be pumped from the disposal vessel into the ocean at a rate of 120 gallons per minute per knot, not to exceed 1,200 gallons per minute at a maximum speed of 10 knots.

4.5. Computerized Navigational System

The permittee shall use an onboard computerized electronic positioning system to fix the position of the disposal vessel accurately during all dumping operations. The computerized navigational system and the method to produce a 8.5 inch by 11 inch hard copy of each disposal trip must be approved by EPA Region IX and the USCG Liaison Office (CGLO) Pago Pago. The permittee shall submit the description, specifications and example hard copy plots for the computerized navigational system at least 15 working days before the effective date of the permit. Disposal operations shall not begin until EPA Region IX and CGLO Pago Pago provide the permittee with written approval for the computerized navigation system and the hard copy plots.

4.6. Permitted Times for Disposal Operations

Dumping operations shall be restricted to daylight hours, unless an emergency exists as defined at 40 C.F.R. § 220.1(c)(4). ASEPA and CGLO Pago Pago shall be notified immediately if an emergency exists and ocean disposal is required to protect human life at sea. No later than 5 working days after the emergency, the permittee and the waste transporter shall provide EPA Region IX, ASEPA and CGLO Pago Pago with a detailed written report on the emergency situation.

4.7. Reporting of the Ocean Dumping Vessel Operations

4.7.1. The waste transporter shall maintain and the permittee shall submit copies of a daily transportation and dumping log, including hard copy plots of all information

required in Special Conditions 4.3 and 4.7.2. Copies of the daily logs shall be sent to EPA Region IX, CGLO Pago Pago, and the ASEPA as part of the 3-month report.

4.7.2. The logbook shall contain the following information for each disposal trip:

4.7.2.1. Permit number, date and consecutive trip number;

4.7.2.2. Record of contact with ASEPA and CGLO before each trip to the ocean disposal site.

4.7.2.3. The time when loading of the vessel commences and ceases in Pago Pago Harbor;

4.7.2.4. The volume of fish processing waste loaded into the disposal vessel from each fish cannery;

4.7.2.5. The time and navigational position that dumping commences and ceases;

4.7.2.6. A record of vessel speed and direction every 15 minutes during each dumping operation at the disposal site, and a hard copy of the vessel's course defined in Special Condition 4.3;

4.7.2.7. Discharge rate from the disposal vessel.

4.7.2.8. Observe, note and plot the time and position of any floatable material;

4.7.2.9. Observe, note and plot the wind speed and direction every 30 minutes while dumping fish processing wastes at the designated disposal site;

4.7.2.10. Observe and note current direction at the beginning and end of the disposal trip, and the direction of the disposal plume at the end of the disposal operation;

4.7.2.11. Observe, note and plot the presence of the previous disposal plume and any unusual occurrences during the disposal trip, or any other information relevant to the assessment of environmental impacts as a result of dumping activities; and

4.7.2.12. Any unusual occurrences noted under Special Condition 4.7.2.9 shall be highlighted in the report defined in Special Condition 3.3.1.

5. SPECIAL CONDITIONS - DUMP SITE MONITORING

The monitoring program for disposal of fish processing wastes in the ocean must document effects of disposed wastes on the receiving waters, biota, and beneficial uses of the receiving waters; compliance with EPA's Ocean Dumping Regulations; and determine compliance with permit terms and conditions. Revisions to the monitoring program may be made under the direction of EPA Region IX at any time during the permit term, in compliance with 40 C.F.R. §§ 223.2 and 223.3. This may include a change in the number of parameters to be monitored, the

frequency of monitoring, the location of sample stations, or the number and size of samples to be collected.

Implementation of the disposal site monitoring program and all segments of the monitoring program specified in Special Condition 5 and Appendix A shall be the responsibility of the permittee.

5.1. **Monitoring Program**

The permittee shall conduct the monitoring program, defined in Appendix A, to determine the environmental impacts of ocean dumping of fish processing waste. If possible, monitoring cruises shall be scheduled within the first two weeks of each month to allow enough time for laboratory analysis and report writing in compliance with Special Condition 5.2. The permittee shall notify the ASEPA at least 48 hours before any scheduled monitoring activities.

5.2. **Monitoring Reports**

Monthly site monitoring reports shall be submitted to EPA Region IX, the ASEPA, NMFS, USFWS and WPRFMC with the 3-month reports as specified in Special Condition 3.3.2. The reports shall include: neatly compiled raw data for all sample analyses, quality assurance/quality control data, statistical analysis of sample variability between stations and within samples for each parameter, and a detailed discussion of the results.

5.3. **Final Summary Report**

5.3.1. A report shall be submitted to EPA Region IX, ASEPA, NMFS, USFWS and WPRFMC 60 days after the permit expires. This report shall summarize all of the data collected to characterize fish processing wastes and the results of the dump site monitoring program specified in this special permit.

5.3.2. At a minimum, the summary report shall contain the following sections:

5.3.2.1. Introduction (including a summary of previous ocean disposal activities),

5.3.2.2. Location of Sampling Sites,

5.3.2.3. Materials and Methods,

5.3.2.4. Results and Discussion (including comparisons and contrasts with previous MPRSA § 102 research and special permit data related to disposal of fish processing wastes off American Samoa),

5.3.2.5. Conclusions; and

5.3.2.6. References.

5.4. **Quality Assurance/Quality Control**

5.4.1. All appropriate phases of the monitoring, sampling, and laboratory analytical procedures shall comply with the EPA Region IX-specified protocols and references listed in Special Condition 3.1.2.

5.4.2. The qualifications of the on-site Principal Investigator in charge of the field monitoring operation at the dump site shall be submitted to EPA Region IX and the ASEPA for approval before the initial monitoring cruise. Notification of any change in this individual shall be submitted to EPA Region IX and ASEPA at least 7 days before the cruise is scheduled.

6. SPECIAL CONDITIONS - NOTICE TO REGULATORY AGENCIES

6.1. Notice of Sailing to the U.S. Coast Guard Liaison Office and the American Samoa Environmental Protection Agency

6.1.1. The waste transporter shall provide telephone notification of sailing to CGLO Pago Pago at 633-2299 and the ASEPA at 633-2304 during working hours (7:00 a.m. to 3:30 p.m.) no later than 24 hours before the estimated time of departure for the dump site defined in Special Condition 2.2. A record of contact with both agencies shall be reported with other information for each disposal trip.

6.1.2. The waste transporter shall immediately notify CGLO Pago Pago and the ASEPA upon any changes in the estimated time of departure greater than two hours.

6.1.3. Surveillance of activities at the dump site designated in Special Condition 2.2, may be accomplished by unannounced aerial overflights, a USCG shiprider and/or a ASEPA shiprider who will be on board the towing/conveyance vessel for the entire voyage. Within two hours after receipt of the initial notification the waste transporter will be advised whether or not a shiprider will be assigned to the waste transporter's disposal vessel.

6.1.4. The following information shall be provided to CGLO Pago Pago and the ASEPA in the notification of sailing defined above:

6.1.4.1. The time of departure,

6.1.4.2. Estimated time of arrival at the dump site,

6.1.4.3. Estimated time of departure from the dump site, and

6.1.4.4. Estimated time of return to port.

6.2. Reports and Correspondence

6.2.1. Two copies of all reports and related correspondence required by General Condition 1.10, Special Conditions 3.2, 3.3, 4.3, 4.5, 4.6, 4.7, 5.2, 5.3, 6.1, and all other materials, including applications shall be submitted to EPA Region IX at the following address:

Office of Pacific Island and Native American Programs (E-4)
U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, California 94105-3901
Telephone (415) 744-1594

6.2.2. Two copies of all reports required by General Condition 1.10 and Special Conditions 4.5, 4.6, 4.7 and 6.1 sent to the U.S. Coast Guard shall be submitted to the following address:

Commanding Officer
U.S. Coast Guard Liaison Office
P.0. Box 249
Pago Pago, American Samoa 96799
Telephone (684) 633-2299

6.2.3. Three copies of all reports required by General Condition 1.10 and Special Conditions 3.2, 3.3, 4.3, 4.5, 4.6, 4.7, 5.2, 5.3, and 6.1 sent to the American Samoa Environmental Protection Agency shall be submitted to the following address:

Director
American Samoa Environmental Protection Agency
Office of the Governor
Pago Pago, American Samoa 96799
Telephone (684) 633-2304

6.2.4. One copy of the all reports required by Special Conditions 3.3, 5.2 and 5.3 shall be sent to the USFWS, the NMFS and the WPRFMC at the following addresses:

Project Leader
Office of Environmental Services
U.S. Fish and Wildlife Service
300 Ala Moana Boulevard
P.0. Box 50167
Honolulu, Hawaii 96850

Western Pacific Program Officer
National Marine Fisheries Service
2570 Dole Street
Honolulu, Hawaii 96822-2396

Executive Director
Western Pacific Regional Fishery Management Council
1164 Bishop Street, Suite 1405
Honolulu, Hawaii 96813

Signed this _____ day of _____, 1993

For the Regional Administrator:

_____
Harry Seraydarian, Director
Water Management Division
U.S. EPA, Region IX

APPENDIX A

SPECIAL OCEAN DUMPING PERMIT OD 93-02
OCEAN DUMP SITE MONITORING PLAN

7. MONITORING OF RECEIVING WATER

Monitoring of the receiving waters at the disposal site defined in Special Condition 2.2 shall be the responsibility of the permittee. Funding and cooperation for site monitoring may be accomplished through an agreement between permittee and other permittees authorized to use the disposal site. Any agreements negotiated between the permittee and other authorized permittees shall be the sole responsibility of the permittee named in this permit. EPA Region IX requires that a monitoring program be developed that complies with the special conditions defined below.

During each monitoring cruise, the disposal plume from the disposal vessel shall be sampled by taking discrete water samples for the measurement of parameters listed in Special Condition 7.2.4. Results of the first 3-month monitoring report will be evaluated by EPA Region IX to determine whether portions of Special Conditions 7 and/or 8 will be revised. The evaluation will be based on documented sampling results and recommendations by the permittee(s).

7.1. Location of Water Sampling Stations

7.1.1. On each sampling cruise, the latitude and longitude of all sampling stations shall be determined and plotted using an acceptable navigational system.

7.1.2. The Principal Investigator shall ensure that discrete water samples are taken at the locations marked in Figure 1.

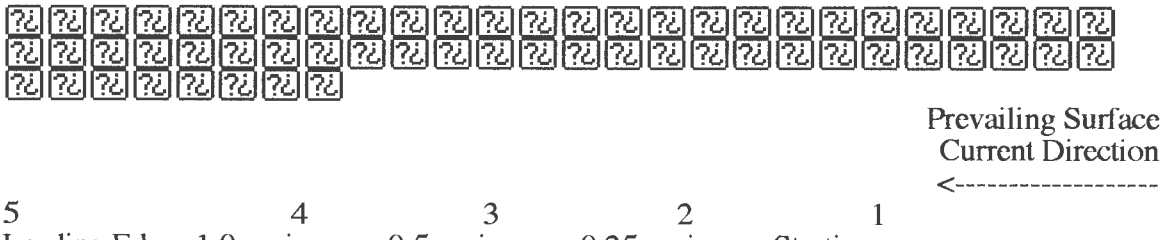


Figure 1. Orientation of Sample Stations (Top View) in the Middle of the Discharge Plume Visually Identified at the Time of Sampling.

7.1.3. The following stations, defined in Figure 1, shall be sampled on each sampling cruise:

7.1.4.1. Station 1 shall be the starting point of the dumping operation as determined in Special Condition 4.3.

7.1.4.2. Station 2 shall be 0.25 nautical miles (nmi) down-current from Station 1.

7.1.4.3. Station 3 shall be 0.5 nmi down-current from Station 1.

7.1.4.4. Station 4 shall be 1.0 nmi down-current from Station 1.

7.1.4.5. Station 5 shall be at the leading edge of the discharge plume, but within the plume.

7.1.4. The Principal Investigator shall ensure that each sampling station is positioned as close as possible to the middle of the discharge plume according to his/her best professional judgment.

7.2. Water Column Characteristics to Be Measured

7.2.1. Discrete water samples at Stations 1, 2, 3, 4, and 5 shall be taken at depths of 1, 3, and 10 meters from the surface at the middle of the plume visually identified by the Principal Investigator.

7.2.2. Surface water conditions shall be recorded at all stations including:

7.2.2.1. Wind speed and direction;

7.2.2.2. Current direction and wave height; and

7.2.2.3. Observations of plume color (e.g., Forel-Ule color scale), odor, floating materials, grease, oil, scum, and foam.

7.2.3. Water samples shall be obtained using a self-closing 3-liter water sample device at each depth listed in 7.2.1.

7.2.4. Water column parameters analyzed from discrete samples taken at the depths listed in 7.2.1 shall include:

Table 4. Physical and Chemical Parameters to be Analyzed from Water Samples Taken at the Ocean Disposal Site.

Parameter[a]	Method Detection Limit
Total Suspended Solids	10.0 mg/L
Total Volatile Suspended Solids	10.0 mg/L
Oil and Grease	10.0 mg/L
Total Phosphorus	1.0 mg/L
Total Nitrogen	1.0 mg/L
Ammonia	1.0 mg/L
pH	0.1 pH units

a = Samples should be acidified to pH <2 with sulfuric acid and refrigerated a 4°C until analysis.

7.2.5. Temperature measurements shall be taken at depths of 1, 3, and 10 meters at the starting point of the disposal operation, as defined in Special Condition 4.3.3.

7.3. Frequency of Sampling

7.3.1. Water samples shall be collected when dumping operations occur. Each station listed under Special Condition 7.1 shall be sampled once each month. These samples shall be used to characterize the receiving waters at the disposal site.

7.3.2. Control samples shall be taken at Station 1 before dumping activities.

7.3.3. Station 1 shall be sampled at a point within the plume immediately after discharge operations cease.

7.3.4. Stations 2 through 5 shall be sampled consecutively at distances indicated in Special Condition 7.1.4 to allow efficient sampling of the discharge plume. The time between each sample and the sampling location, beginning with the control sample and ending with the sample collected at the leading edge of the plume, shall be recorded.

7.4. Water Quality Criteria and Standards

7.4.1. The LPC of the liquid phase of the fish processing wastes shall not be exceeded at the disposal site boundary four hours after disposal operations cease. The LPC, as defined at 40 C.F.R. §227.27,shall not exceed applicable American Samoa Oceanic Water Quality Standards (see Table 1). EPA Region IX and the ASEPA will evaluate the LPC based on EPA's Ocean Dumping Regulations and the concentration of parameters measured at the stations sampled during the tenure of this permit.

8. MONITORING OF BIOLOGICAL COMMUNITIES

8.1. Pelagic Resources

8.1.1. All sightings of fish, sea turtles, sea birds, or cetaceans near the disposal site shall be recorded including:

8.1.1.1. Time, location and bearing;

8.1.1.2. Species name(s); and

8.1.1.3. Approximate number of individuals.

APPENDIX B - REPORT FORM 1

Monthly Volumes of VCS Samoa Packing Fish Processing Wastes Generated Per Day and Volumes of Fish Processing Wastes Disposed at the Ocean Site

Month ____________ 19__

OD 93-02	DAF Sludge Generated (gallons/day)	Cooker Water Generated (gallons/day)	Press Water Generated (gallons/day)	Total Generated (gallons/day)
Permit Limits	60,000	100,000	40,000	200,000

Date	DAF Sludge Generated (gallons/day)		Precooker Water Generated (gallons/day)		Press Water Generated (gallons/day)		Total Generated (gallons/day)		Volume Ocean Disposed (gallons/day)	

OLD — See new form

Date	DAF Sludge Generated (gallons/day)		Precooker Water Generated (gallons/day)		Press Water Generated (gallons/day)		Total Generated (gallons/day)		Volume Ocean Disposed (gallons/day)	
Monthly Totals										

OLD - DELETE

NOTE: An asterisk (*) to the right of the fish processing waste volume signifies that a violation of the permit limit has occurred. The number of violations are shown in the Monthly Totals row.

Monthly quantities of alum (aluminum sulfate) and coagulant polymer added to the fish processing waste streams:

Aluminum sulfate: _____ pounds/month

Coagulant polymer: _____ pounds/month

See new form

APPENDIX B - REPORT FORM 2

Data Form for 3-Month Report on Waste Stream Analyses for VCS Samoa Packing MPRSA § 102 Permit #OD 93-02

Reporting Period: From _____ 19__ To _____ 19__

VCS Samoa Packing - Dissolved Air Flotation (DAF) Sludge

Month & Year	Total Solids (mg/L)	Total Volatile Solids (mg/L)	5-Day Biological Oxygen Demand (mg/L)	Oil and Grease (mg/L)	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)	Amn (mg
OD 93-02 Permit Limits	461,790	455,560	349,350	395,700	3,790	21,820	3,4

VCS Samoa Packing - Precooker Water

Month & Year	Total Solids (mg/L)	Total Volatile Solids (mg/L)	5-Day Biological Oxygen Demand (mg/L)	Oil and Grease (mg/L)	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)	Amn (mg
OD 93-02 Permit Limits	115,180	84,450	64,650	11,180	1,850	12,830	4

VCS Samoa Packing - Press Water

Month & Year	Total Solids (mg/L)	Total Volatile Solids (mg/L)	5-Day Biological Oxygen Demand (mg/L)	Oil and Grease (mg/L)	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)	Amn (mg
OD 93-02 Permit Limits	381,510	409,310	365,550	164,860	2,950	35,100	8

NOTE: An asterisk (*) next to the waste concentration signifies that a violation of the permit limit has occurred.

See new form — spreadsheet for on-shore storage tank only

Cumulative Yearly Data on Fish Processing Wastes Generated at VCS Samoa Packing's Plant and Disposed at the Ocean Site.

MPRSA §102 Special Permit #OD 93-02

Reporting Period: From _____ 19__ To _____ 19__

Month & Year	DAF Sludge Generated (gallons/month)	Cooker Water Generated (gallons/month)	Press Water Generated (gallons/month)	Total Generated (gallons/month)	Aluminum sulfate (pounds/month)	Coagulant polymer (pounds/month)	Oc (ga
Cumulative Yearly Totals							

OLD - DELETE

NOTE: A separate table shall be prepared for each calendar year.

See new form

⊛ Ask Pat — application(s) from canneries

FACT SHEET- SPECIAL OCEAN DUMPING PERMIT STARKIST SAMOA (OD 93©01) AND VCS SAMOA PACKING COMPANY (OD 93©02)É LOCATED IN PAGO PAGO, AMERICAN SAMOA SUMMARY

The U.S. Environmental Protection Agency (EPA) Region IX has received complete applications from StarKist Samoa, Incorporated and VCS Samoa Packing Company, Incorporated for continued ocean disposal of fish processing wastes off Pago Pago, American Samoa. Disposal of fish processing wastes was permitted under ~~two~~ previous Marine Protection Research and Sanctuaries Act (MPRSA) 102 Special Permits, OD 90©01 (StarKist Samoa) and OD 90©02 (VCS Samoa Packing). These permits began on July 31, 1990 and are effective until July 30, 1993. Disposal operations occurred at a designated site (55 FR 3948, February 6, 1990) located 5.45 nautical miles from land (14° 24.00' South latitude by 170° 38.20' West longitude) with a radius of 1.5 nautical miles in about 1,500 fathoms of water. The Regional Administrator has tentatively decided to issue special ocean dumping permits (OD 98©01 and OD 98©02, respectively) to the applicants for ocean disposal of fish processing wastes over a three©year period. This decision has been made according to EPA's
authority established in Title I of the Marine Protection, Research and Sanctuaries Act of
1972 (MPRSA) (33 U.S.C. section 1401 et seq.). Section 104B(k)(3)(B) of MPRSA contains
an exclusion from the ban on disposal of industrial waste for tuna canneries in American
Samoa. The conditions and monitoring activities defined in OD 98©01 and OD 98©02 are
similar to those in previous special and research ocean dumping permits. However, several
changes have been made to: 1) permitted waste concentrations, 2) waste stream monitoring,
3) reporting requirements, and 4) disposal vessel operations. The changes are based on individual and combined
evaluation of waste stream data, confirmation of past toxicity tests and recent plume modeling and
new navigation requirements for the disposal vessel. EPA Region IX has tentatively decided to proceed with issuance of these special
permits. Comments on our proposed action will be requested from the permit applicants, the American Samoa Government, Federal agencies, and

the public as required under EPA's Ocean Dumping Regulations at 40 C.F.R Parts 220 through 228. Draft special permits and supporting documents are available for public review at the U.S. EPA's Regional Office in the Library on the 13th Floor at 75 Hawthorne Street, San Francisco, California; the U.S. EPA's Pacific Island Contact Office, 300 Ala Moana Boulevard, Honolulu, Hawaii; and the American Samoa Environmental Protection Agency, Executive Office Building, Office of the Governor, Pago Pago, American Samoa. These documents define the principal facts and significant legal, administrative and policy questions considered in the development of the special permits. TENTATIVE DECISION: On December 8, 1992, StarKist Samoa and VCS Samoa Packing Company applied for ocean dumping permits to dispose of their fish cannery wastes at a designated ocean disposal site near Pago Pago, American Samoa. The designated site, used for the past 6 years by both canneries, is located 5.45 nautical miles from land (14° 24.00' South latitude by 170° 38.20' West longitude) with a radius of 1.5 nautical miles in 1,502 fathoms of water [40 C.F.R. § 228.12(b)(74)]. EPA Region IX is planning to grant their applications by issuing a special ocean dumping permit to each cannery which will last for three years. Current information indicates that disposal of fish processing wastes at the designated site complies with EPA's Ocean Dumping Regulations at 40 C.F.R. Parts 227 and 228. Information obtained during the term of the special permits will be used to evaluate whether the disposal of fish processing wastes continues to comply with criteria defined in EPA's Ocean Dumping Regulations. The permittees must conduct a site monitoring program, including field and laboratory analyses. Results of the monitoring program will be used to document the extent of effects at the ocean disposal site and whether the dumping continues to comply with EPA's Ocean Dumping Regulations. The proposed dumping during the term of the special permits is expected to have minimal impacts on human health and/or the marine environment, as demonstrated by the monitoring results of the previous special and research ocean dumping permits. The primary environmental impact of the proposed discharges would be short-term increases in turbidity, inorganic nutrients, oil and grease, and ammonia during the dumping events. Past monitoring studies on the disposal of fish processing wastes off American Samoa show that water quality parameters return to ambient conditions at the boundary of the disposal site following the four-hour period of initial mixing (40 C.F.R. § 227.29). To be certain that American Samoa Water Quality Standards would not be violated by the disposal of fish processing wastes, the center of the disposal site was designated 5.45

and combined wastes,

nautical miles offshore, and restrictive disposal rates and limitations on the waste material constituents are included in the special ocean dumping permits. TERMS OF THE PERMIT~~##~~ Special ocean dumping permits OD 93©01 and OD 93©02 are similar to OD 93©01 and OD 93©02, except those changes outlined above. The permittees have been disposing of fish cannery wastes, monitoring the waste streams and the disposal site according to the specifications of the past special and research permits.

A. Volumes of Waste Material Proposed for Ocean Disposal Table 1.ƒ Volumes of Fish Processing Waste Authorize for Daily Disposal (see Special Condition 2.3 in both permits). Fish ProcessingÉ StarKist SamoaÉ (gallons/day)ƒ VCS SamoaÉ PackingÉ (gallons/day)ƒ Total VolumeÉ (gallons/day)ƒ DAF Sludge 60,000É 60,000É 120,000É Cooker Juice 100,000É 100,000É Precooker Water 100,000É 100,000É Press Liquor 40,000É 40,000É Press Water 40,000É 40,000É Daily Maximum 200,000É 200,000É 400,000É Waste Material Limitations in the Proposed Permits (see Special Condition 2.4 in both permits)~~##~~ Table 2/ Fish Processing Waste Limits for the StarKist Samoa's Permit #OD 93©01. Physical or ChemicalÉ ParameterÉ (units)√ Sludgeƒ CookerÉ Liquorƒ Total Solids (mg/L) 163,430É 114,180É 327,870É Total Volatile Solids (mg/L) 136,180É 63,400É 292,280É Day BOD (mg/L) 232,320É 185,150É 310,790É Oil and Grease (mg/L) 64,100É 11,810É 112,080É Total Phosphorus (mg/L) Total Nitrogen (mg/L) 20,360É Ammonia (mg/L) pH (pH units) 5.3 to 6.5É 5.9 to 6.3É 5.8 to 6.5É Density (g/mL) 0.97 to 1.06É 0.98 to 1.06É 0.99 to 1.08É a =¬ All calculated values were rounded to the nearest 10, except the density and pH ranges.Δ(# Table 3. Fish Processing Waste Limits for the VCS Samoa Packing's Permit #OD 93©02.ƒ Physical or ChemicalÉ ParameterÉ (units)√ Sludgeƒ PrecookerÉ Total Solids (mg/L) 461,790É 115,180É 381,510 É Total Volatile Solids (mg/L) 455,560É 84,450É 409,310 É Day BOD (mg/L) 349,350É 64,650É 365,550 É Oil and Grease (mg/L) 395,700É 11,180É 165,860 É Total Phosphorus (mg/L) 2,950 É Total Nitrogen (mg/L) 21,820É 12,830É 35,100 É Ammonia (mg/L) pH (pH units) 4.8 to 7.0É 5.5 to 6.6É 5.5 to 6.8 É Density (g/mL) 0.86 to 1.05É 0.95 to 1.06É 0.96 to 1.06 All calculated values were rounded to the nearest 10, except the density and pH ranges.~~##~~ Calculation of Permit Limits~~##~~ Data from the previous special ocean dumping permit issued to each cannery were used to calculate all permit limits. The data for each cannery were evaluated separately. ~~##~~ The following calculations were made for each set of data using the ~~LOTUS©123~~ spreadsheet program, ~~version 2.2:~~ maximum and minimum levels; mean, standard deviation and the number of data points. ~~##~~ Any data values greater than or less than

Excel 5.0

Adjust table to reflect combined wastes

the mean plus or minus 2 standard deviations, were considered to be outliers. Outlier data points were not used in the permit limit calculations. All procedures for calculating permit limits are discussed in Sections 3.1.1 and 3.1.2 (pages 3-1 to 3-9) of EPA's Guidance Document for Ocean Dumping Permit (January 30, 1988). The mean and standard deviation of each physical or chemical parameter were calculated by the following equations: Δ NΔ(#∏ = each value for the ith constituentΔ(#` Δ N = the number of data points reportedΔ(#` Δ Standard Deviation√ The permit limit (Upper Limit) was determined by taking the mean and adding the product of a constant multiplied by the standard deviation.Δ(#` Δ Upper Limit√ = Mean√ + (k x Standard Deviation√ k = a constant from Table 3-2 in EPA's 1988 Guidance Document.Δ(#` Δ The constant (k) is based on N and two variables, probability (¿) and proportion (P), used to compute permit limits. In this case, all limits were calculated with gamma = 0.95 and P = 0.95.Δ

Equations

FACTORS CONSIDERED IN REACHING THE PERMIT DECISIONS Overview of Disposal Operations The two fish canneries in American Samoa, StarKist Samoa and VCS Samoa Packing Company, propose to dispose of fish processing wastes at an ocean dump site centered approximately 5.45 nautical miles south of Tutuila Island in 1,502 fathoms of water. The center coordinates of the site are: 14° 24.00' South latitude by 170° 38.20' West longitude. The fish processing wastes will be transported to the upcurrent quadrant of the site and discharged at a rate less than or equal to 1,400 gallons per minute, depending on the season, at a maximum speed of 10 knots (see Special Condition 4.4). The disposal vessel will discharge the fish processing wastes along an oval-shaped track with the major ~~center~~ axis of the oval perpendicular to the current direction. All disposal will occur within the boundary of the designated ocean disposal site. On each trip, the master of the disposal vessel will document current direction at the center of the disposal site. He will then proceed to a point 1.1 nautical miles upcurrent of the prevailing surface current to discharge the waste. The fish processing wastes may be discharged only after this procedure has been conducted. This will ensure that the waste plume has an adequate area for mixing within the disposal site boundary. Receiving waters at the disposal site are outside the American Samoa territorial sea. Though the ocean disposal site is outside these waters, the MPRSA § 102 special permits are designed to comply with oceanic water quality standards defined in § 24.0207(g)(1-7) of the American Samoa Water Quality Standards (see Table 1 under General Condition 1.5).

(outlining the target area)

This will ensure that oceanic waters inside American Samoa's territorial sea are not affected by the ocean disposal operations. Four hours after dumping has ceased, concentrations of the fish processing wastes must reach ambient levels (40 C.F.R. section 227.29) at the disposal site boundary. Disposal site monitoring requirements are contained in the special permits. EPA Region IX will evaluate potential impacts to water quality based on the site monitoring reports. Changes from the Previous MPRSA 102 Special Permits ~~A new ocean disposal vessel will be authorized for the 1993 special permits (see page 1 of each permit). The MV ASTRO will be replaced by the FV TASMAN SEA (formerly the FV BLUE NORTH). The new disposal vessel is owned by Blue North Fisheries, Inc., at 1130 N.W. 45th Street, Seattle, WA 98107©4626.Δ(#~~ EPA Region IX reviewed ~~29©30~~ months of waste stream monitoring data submitted by each permittee. The characteristics of the waste streams at the two canneries are entirely different; therefore, separate permits ~~were~~ are necessary. Appendix A of this fact sheet contains the tables used to calculate the ~~new~~ permit limits for each permittee's waste stream defined in Section III.B above. The last part of each table shows the numerical changes from the previous special permits compared to the proposed special permits. ~~ΔC#~~ In general, most of the limits for StarKist Samoa's waste stream ~~were reduced~~ (see Appendix A, Tables 1©3). Some limits were reduced as much as 90%. The only exceptions are: Cooker Juice oil and grease (+145%), Press Liquor total solids (+21%), Press Liquor total phosphorus (+59%), and Press Liquor oil and grease (+80%). These increases in the waste stream limits are required because earlier waste stream data do not reflect the present waste stream characteristics. Δ(#` Δ Similarly, most of the limits for VCS Samoa Packing's waste streams ~~were reduced~~ (see Appendix A, Tables 4©6). Some limits were reduced as much as 85%. The only exceptions are: DAF Sludge total nitrogen (+46%), DAF Sludge oil and grease (+40%), DAF Sludge total volatile solids (+48%), DAF Sludge ammonia (+35%), Precooker Water 5©day biological oxygen demand (+7%), Press Water total nitrogen (+10%) and Press Water total volatile solids (+6%). These increases in the waste ~~stream~~ limits are required because earlier waste stream data did not properly characterize these waste streams. Δ(#` Δ Reports analyzing metal and petroleum hydrocarbon concentrations in the waste streams were submitted by StarKist Samoa (July 29, 1993) and VCS Samoa Packing (July 31, 1993). These reports were required under Special Condition 3.3.5 in the previous MPRSA ¿ 102 special permits. EPA Region IX reviewed the permittees' analyses of metal and

petroleum hydrocarbon concentrations and the permittees' explanation of the sources. The reports document low concentrations of metals and petroleum hydrocarbons for each waste stream.(@# EPA Region IX reviewed data submitted with the last 29©30 months of reports and we found low concentrations of metals in the waste streams. Table 4 below displays the mean and standard deviation for the concentrations listed in the tables of Appendix A. High values of aluminum in the DAF Sludge are expected because aluminum sulfate is added as an odor reducing agent. The high values for petroleum hydrocarbons are most likely a result of interference in the analysis by high concentrations of fish oils.Δ(# Table 4.*f* Concentrations of Metals and Total Recoverable Petroleum Hydrocarbons in StarKist Samoa (SK) and VCS Samoa Packing (VCS) Waste Streams Reported for MPRSA ¿ 102 Permits OD 90©01 and OD 90©02. (mg/L)É (mg/L)É (mg/L)É (mg/L)É (mg/L)É (mg/L)É SK Mean 473.00 1924.00 336.00 841.00 VCS Mean 13393.00 VCS SD 9339.00 SK Mean VCS Mean 119.00 VCS SD SK Mean 961.00 531.00 VCS Mean 2471.00 VCS SD 2478.00 DAF = Dissolved Air Flotation Sludge PC = StarKist Samoa Cooker Juice and VCS Samoa Packing Precooker Water PW = StarKist Samoa Press Liquor and VCS Samoa Packing Press Water SD = Standard Deviation EPA Region IX determined that these levels do not pose a significant risk to the marine environment or human health based on the design of disposal operations and dilution at the disposal site. Therefore, requirements to analyze metals and petroleum hydrocarbons in the permittees' waste streams have been deleted from the new permits.Δ(# Two new data reporting forms were developed for the 1993 ocean dumping permits (see Appendix B of each permit). These forms, and data submitted on a computer diskette compatible with EPA Region IX's computer system, will streamline the 6™month data reporting requirements.Δ(# The canneries must conduct confirmatory suspended particulate phase bioassays within one year of the effective date of the permit (see Special Condition 3.3.5). These tests are required because the nature of the fish processing wastes has changed from the initial characterization of the waste streams conducted more than 5 years ago. Results of the new bioassays will be used to calculate new Limiting Permissible Concentration (LPC) values. The new LPC values will be used to rerun the plume model used to predict dilution and discharge rates at the ocean disposal site. A report will be prepared by each permittee discussing the test procedures and results of the bioassay tests and new model runs. EPA Region IX will review the report to determine whether any changes in the ocean dumping permits are necessary.Δ(# A computerized navigation system is specified in Special

Condition 4.3.4 and 4.5 to simplify plotting of the disposal vessel's track once inside the ocean disposal site and during disposal operations. This system will provide a continuous plot of the disposal vessel's track and a hard copy of each plot will be sent with the 6©month report. Δ(# EPA'S AUTHORITY TO ISSUE OCEAN DUMPING PERMITSΔ(# EPA's authority to issue special ocean dumping permits is defined under Title I of MPRSA and at 40 C.F.R. ¿ 220.4. The authority to issue special permits was delegated to the Regional Administrator on January 11, 1977 (42 FR 2462). The Regional Administrator's authority to issue special permits was redelegated to the EPA Region IX Water Division Director on January 25, 1982 (EPA Region IX Order R1250.5A).Δ(# Section 102 of MPRSA authorizes EPA to issue permits for ocean dumping. The Agency must determine that the proposed dumping will not unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities. In addition to these requirements, EPA must evaluate each permit application to determine whether the dumping will comply with the criteria at 40 C.F.R. Part 227 and whether the designated site complies with the criteria at 40 C.F.R. Part 228.Δ(# The American Samoa Fish Processing Waste disposal site was designated, through the publication of a Final Rule, on February 6, 1990 (55 FR 3948) at 40 C.F.R. ¿ 228.12(b)(74). The designation process consisted of publication of an environmental impact statement (EIS) according to EPA's voluntary EIS policy. The draft EIS for this project was published on September 16, 1988 (53 FR 38118) and a final EIS was published on March 3, 1989 (54 FR 9083). The final rule designating the ocean disposal site was published on February 6, 1990 (55 FR 3948).Δ(# EPA Region IX will periodically evaluate the special permits to determine whether the fish canneries disposal operations comply with the special permit conditions. If unacceptable impacts are detected at the site (40 C.F.R. section 228.10), or significant permit violations are found, EPA will determine whether use of the site should be restricted (40 C.F.R. sections 228.10 and 228.11), or whether enforcement actions should be initiated under MPRSA ¿ ADMINISTRATIVE PROCEDURES AND THE PUBLIC HEARING PROCESSΔ(# The processing of an ocean dumping permit consists of the following actions:Δ(# EPA receives a completed application (40 C.F.R. ¿ 221).Δ(#` Δ EPA issues a tentative decision whether to grant or deny the special permit (40 C.F.R. ¿ 222.2). A draft permit is the means by which EPA documents the intent to grant an ocean dumping permit.Δ(#` Δ A public notice is issued to announce EPA's intent to issue the permit (40 C.F.R. ¿ 222.3). The notice contains the following elements: summary,

tentative determination, factors considered in reaching the tentative determination, hearing process, and the location of all information on the draft permit. Public notices describing EPA's intent to issue a permit are published in a daily newspaper in closest proximity to the proposed dump site and in a daily newspaper in the city in which EPA's Regional Office is located.Δ(#` Δ Before a final decision can be made on the special permit, formal consultation must be documented with the following agencies: American Samoa Government, U.S. Army Corps of Engineers, U.S. Coast Guard, National Marine Fisheries Service, U.S. Fish and Wildlife Service and the Shellfish Sanitation Branch of the Food and Drug Administration.Δ(#` Δ Initiation of a Public HearingΔ(# Within 30 days of the date of the public notice, any person may request a public hearing to consider issuance or denial of the special permit or conditions to be imposed upon this permit. Any request for a hearing must be made in writing; must identify the person requesting the hearing; and must clearly state any objections to issuance or denial of the permit or to the conditions to be imposed upon the permit, and the issues to be considered at the hearing. According to 40 C.F.R. ¿ 222.4, the Regional Administrator may schedule a hearing, at his discretion, based on genuine issues presented in the written request.Δ(#` Δ Upon receipt of a written request presenting genuine issues amenable to resolution by a public hearing, the Regional Administrator may determine a time and place for the hearing and publish a notice of the hearing. All interested parties will be invited to express their views on the proposed' issuance or denial of the permit at the hearing if one is held. If a request for a public hearing is made within 30 days of the date of this notice and does not meet the above criteria, the Regional Administrator must advise the requesting person of his decision to deny the hearing in writing and proceed to rule on the application.Δ(#` Δ Following adjournment of the public hearing, the Presiding Officer, appointed by the Regional Administrator, prepares written recommendations about the issuance, denial or conditions to be imposed upon the permit after full consideration of the views and arguments expressed at the hearing (40 C.F.R. ¿ 222.6 through 222.8). The Presiding Officer's recommendations and the record of the hearing are forwarded to the Regional Administrator within 30 days of the hearing.Δ(#` Δ The Regional Administrator makes a determination whether to issue, deny or impose conditions on the permit within 30 days of receipt of the Presiding Officer's recommendations. He must give written notice of the decision to any person appearing at the public hearing (40 C.F.R. ¿ 222.9). Δ(#` Δ A final permit becomes effective 10

days after issuance, if no requests for an adjudicatory hearing are received. Requests for an adjudicatory hearing may be made to the Regional Administrator within 10 days of receipt of the notice to issue or deny the permit (40 C.F.R. ¿ 222.10 and ¿ 222.11). An appeal of the Regional Administrator's adjudicatory hearing decision may be made in writing to the Administrator of EPA within 10 days following receipt of the Regional Administrator's determination on the need for an adjudicatory hearing (40 C.F.R. ¿ 222.12).Δ(#` Δ VII. ADDITIONAL INFORMATION For further information on the special permits, requests for copies of the permits or questions pertaining to MPRSA regulations, please contact either of the following people at EPA Region IX: Janet Y. Hashimoto, ChiefΔ(#` Δ Marine Protection Section (W©7©1)Δ(#` Δ U.S. Environmental Protection AgencyΔ(#` Δ 75 Hawthorne StreetΔ(#` Δ San Francisco, California 94105©3901Δ(#` Δ (415) 744©1156Δ(#` Δ Patricia YoungΔ(#` Δ Office of Pacific Island and Native American Programs (E©4)Δ(#` Δ U.S. Environmental Protection AgencyΔ(#` Δ 75 Hawthorne StreetΔ(#` Δ San Francisco, California 94105©3901Δ(#`Δ (415) 744©1594